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Evaluation of Management Tools in the Occoquan Watershed

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During the period May, 1979-May 1981, nine water quality monitoring stations were operated in small catchments in the Occoquan Watershed of Northern Virginia. The study sites incorporated different land uses (pastureland, corn croplands, suburban development, and forest) as well as contrasting management approaches (heavy vs. light grazing, no-till vs. minimum-till cropping, detention ponds). Water samples were routinely analyzed for total suspended solids, ammonia nitrogen, total Kjeldahl nitrogen, oxidized nitrogen, ortho-phosphorus, total soluble phosphorus, and total phosphorus. Meteorological records were also kept during the study period, and collections of dryfall and precipitation were routinely analyzed.

Loading rates, calculated as kilograms per hectare per centimeter precipitation, indicated the heavily grazed pasture site to generally exhibit the highest pollutant concentrations. The forested site and lightly grazed pasture typically generated the least pollutant export. Significant differences were observed between the no-till and minimum-till croplands. The greatest differences were in the transport of soluble nutrient forms. Results of measurements at the stormwater pond were sometimes ambiguous, but evidence was found that proper maintenance of such a structure greatly improves its efficiency.

Measurements of atmospheric pollutant loadings indicated the greater proportion to be generally from wetfall. Annualized loadings for various constituents were calculated. The existence of acid rain in the study are/was confirmed repeatedly, and the source was hypothesized to be sulfur oxides based upon indirect evidence.

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It should be recognized that the collection of field and laboratory data for an investigation of this nature is particularly arduous. This work would not have been possible without the able assistance of the staff of technical, scientific and support personnel at the Occoquan Watershed Monitoring Laboratory. Their vital role in this endeavor is gratefully acknowledged.

Introduction

This study was designed to characterize nonpoint source pollution from various land use areas within the Occoquan Watershed and to provide a basis for the comparison of selected management practices. The data base was also intended to be used in the calibration of a mathematical pollutant transport model. Actual data collection began May 15, 1979, and continued through May 31, 1981.

STUDY AREA

The Occoquan Watershed is a major tributary to the Potomac Estuary on the southern periphery of the Washington, D.C. metropolitan area. An impoundment at the mouth of the watershed was constructed in 1957 to meet the growing raw water supply needs of the Virginia suburbs of the national capital. The reservoir, which has a full-pool capacity of 3.71×10^7 m^3 and drains an area of 1.48×10^5 hectares (ha), currently serves nearly 700,000 people. The two major sub-basins are Occoquan Creek, which lies to the south, and Bull Run, which lies to the north. The basin is situated astride the Coastal Plain and Piedmont physiographic provinces, with the area tributary to the reservoir lying in the latter. For the most part, the soils of the upper basin overlie the Triassic Shales of the Middle Piedmont, and may be generally characterized as sedimentary sandstones and shales (Pettry, et al., 1970).

The Bull Run sub-basin includes portions of the counties of Fairfax and Prince William, two of the most rapidly developing urban areas in the United States. Development in the last decade has resulted in a large increase in basin population, and has been characterized by large-scale residential and commercial construction over a wide area. Concurrent with the development increases, domestic wastewater and stormwater flows to the basin have increased.

The Occoquan Creek sub-basin, in contrast, has remained largely unchanged throughout the entire period following the impoundment construction. Sub-basin activity remains confined to agriculture with scattered pockets of low density residential development. The agricultural development includes both conventional and minimum till practices for grain production, and a combination of pasturing for both cattle and horses.

In the late 1960's, advancing signs of cultural eutrophication were observed in the reservoir, characterized by periodic blooms of nuisance algae, hypolimnetic deoxygenation, fish kills, and filter clogging at the treatment works of the Fairfax County Water Authority (Eunpu, 1973). Recent studies in the basin have documented the role of nonpoint sources of pollution in determining receiving water quality (Randall, et al., 1977a; Randall, et al., 1977b; Grizzard, et al., 1978; Randall, et al., 1978).

SITE SELECTION CRITERIA

The small watersheds selected for inclusion in the study were screened for adherence to a previously determined set of selection criteria. Initial criteria were as follows:

1. Homogeneity of basin land use (over 90% in the stated use):
2. Representativeness of basin soils (of both the Occoquan and Piedmont watersheds in general);

3. Moderate catchment slopes;
4. Isolation from point sources of atmospheric pollution;
5. Availability of control over site activity for the study duration;
6. Draining area less than 100 acres;
7. Cooperation of landowners to provide management information on pesticide and fertilizer use.

SELECTED STUDY SITES

Nine monitoring stations were established in small watersheds, primarily in agricultural areas. All were located in Prince William and Fauquier Counties (Virginia), and may be located in Figure 1. Drainage areas appropriate to the established criteria were selected with the assistance of the U. S. Cooperative Extension (CES), the U. S. Soil Conservation Service (SCS), and the Virginia Division of Forestry (VDF). General characterizations of land use and management practices at each station are given in Table I. The following station descriptions will help clarify the relationship of the sites to one another.

Site one was a heavily grazed pasture, as evidenced by visible erosion and loss of vegetative cover. The soils in this 12.7 ha drainage area were classified predominately in the "B" hydrologic grouping by SCS. This means they are moderately well drained and relatively inefficient in producing runoff. Whereas the upper reaches of the drainage showed a four percent average slope and better cover vegetation, the lower drainage was characterized by a six percent average slope and thin, poorly established vegetation.

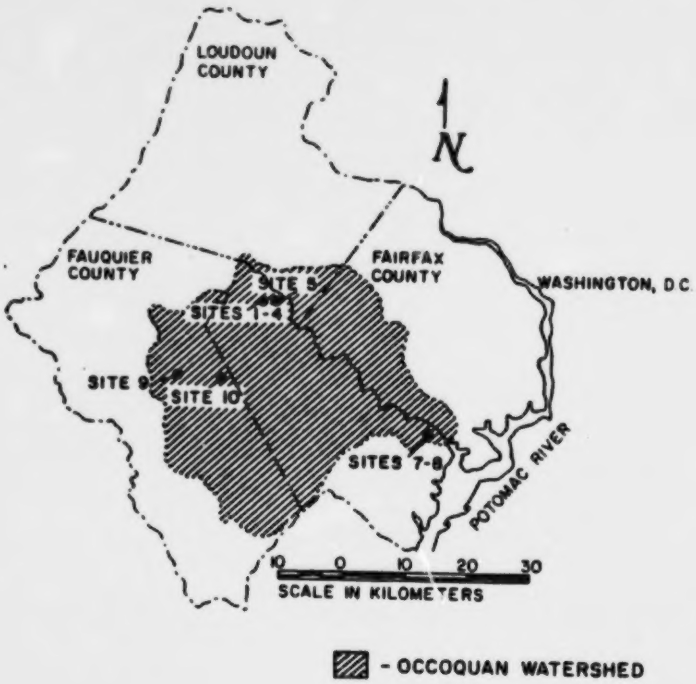
LOUDOUN COUNTY
N
FAUQUIER COUNTY
FAIRFAX COUNTY
WASHINGTON, D.C.
SITE 5
SITES 1-4
SITE 9
SITE 10
SITES 7-8
POTOMAC RIVER
10 0 10 20 30
SCALE IN KILOMETERS
▨ - OCCOQUAN WATERSHED

Figure 1. Location of study sites in the Occoquan Watershed.

Table I
Land Use, Characterization, and Location of Monitored Watersheds

LAND USE	MANAGEMENT FEATURE	SITE NO.	DRAINAGE AREA (hectares)	MAJOR SOILS*	LOCATION LATITUDE (N); LONGITUDE (W)	TOPOGRAPHIC MAP QUADRANGLE
Pastureland	Heavily Grazed	1	12.7	Rapidan Klinesville	38°52'45";77°37'00"	Arcola
Pastureland	Lightly Grazed	5	7.6	Brecknock Penn	38°53'10";77°36'00"	Arcola
Cropland	No-Till Corn (Later, Minimum-Till)	2	10.8	Meadowville Klinesville Rapidan	38°52'40";77°36'50"	Arcola
Cropland	Minimum-Till Corn	10	10.4	Penn Braddock	38°46'15";77°42'30"	Thorougfare Gap
Farm Pond	Stock Pond	4	20.8	Klinesville Rapidan	38°52'40";77°36'40"	Arcola
Hardwood Forest	None	9	30.6	Fauquier Catoctin	38°47'00";77°46'25"	Marshall
Pastureland	Heavily Grazed	3	4.5	Klinesville Rapidan Starr	38°52'40";77°36'50"	Arcola
Suburban Townhouse Development	Stormwater Pond Inflow	7	27.6	Loamy & Gravely Sediments	38°41'05";77°16'30"	Occoquan
Suburban Townhouse Development	Stormwater Pond Outflow	8	35.7	Loamy & Gravely Sediments	38°41'10";77°16'30"	Occoquan

* After Kaster and Porter (1964), and Petro et al. (1956). These classifications may not correlate to descriptive categories used in other geographic areas. Only those soils comprising more than 20% of the drainage area are included.

Site two was a no-till corn field of 10.8 ha, which was located on the same farm as sites one, three and four. Type "B" soils were predominant, and a relatively uniform slope of 8.5 percent was evidenced over the drainage area. Drainage from this area entered the pond discussed below. After the first season of monitoring, the management practice at this location was changed to a minimum-till approach. For that reason reference is sometimes made in this text to sites 2A and 2B. Site 2A incorporates data at site 2 while it was under no-till management--from May, 1979 through December, 1979. In early January, 1980 the field was harrowed, so that from this time on the cropland was better described as being minimum-till in its management.

Site three was a small area of heavily grazed pasture immediately adjacent to the site two drainage, and upstream of a farm pond. The drainage area here was 4.5 ha, with a uniform slope of about ten percent. The primary function of this station was to provide data on input to the farm pond (see site four). However, because heavily grazed pasture on the same farm was already being monitored, and because runoff was seldom experienced except during large events, this station was given low priority. In effect, whenever equipment shortages were experienced, site three was sacrificed first. As a result, only very limited data were collected at this site.

Site four was located immediately below a farm pond receiving runoff from sites two and three. Water flowed from the 5 ha pond by means of a ten cm diameter riser pipe. Pool height in the pond varied seasonally according to precipitation, and at times even the emergency spillway was overtopped. Total drainage area to this lower station was 20.8 ha.

Site five was a very lightly grazed pasture of 7.6 ha. The average slope here was 3.5 percent, and canopy heights of over 60 cm were observed late in the growing season. This site was paired with site one in an attempt to evaluate the effects of different management practices on pollutant loadings.

Site six was originally set up at a no-till corn cropland, but had to be abandoned shortly thereafter because of a change in management practices and problems with landowner cooperation. No data at this site were recorded.

Site seven was a 27.6 ha drainage which collected runoff from a suburban townhouse development via a 183 cm (72 inch) corrugated metal pipe. The Thousand Oaks subdivision, in Lake Ridge, was approximately 90 percent townhouse development, and 10 percent open land. Flow from this drainage proceeded to a dry stormwater management pond, and is paired with site eight.

Site eight provided a measure of the outflow from the Thousand Oaks stormwater pond. Drainage to the pond included an area not measured at site seven, for a total drainage area of 35.7 ha. A perforated riser pipe provided for detention in the pond, with the effluent passing through a 76 cm (30 inch) concrete conduit. Together sites seven and eight provided the potential for compiling a pollutant transport mass balance for the stormwater pond, and thus form a management pair.

Site nine contained 30.6 ha of hardwood forest. Because the area was relatively undisturbed, this site was selected to provide data to represent predevelopment conditions. The average slope in the watershed was 9.4 percent. Good undercanopy vegetation and a thick layer of litter reduced runoff potential at this site.

Site ten contained 10.4 ha of corn representing minimum-till management. The average slope here was about 3.4 percent. This site was paired with site two order to compare effects of management practices on pollutant loadings.

Methodology

Each monitoring station was instrumented to provide data on precipitation and runoff, and to collect runoff samples during storm events. At station one, atmospheric fallout samples were also collected. Meterological parameters--including solar insolation, mean wind speed, net evaporation, temperature and relative humidity--were also measured at this station.

Field Measurements

All of the monitoring stations were fitted with a type-H flume for primary flow control. Continuous stage measurements were recorded using pressure transducer type flowmeters (Sigmamotor Model LMS-400); these measurements were then converted to flow by using available rating tables (Holtan, *et al*., 1962).

Rainfall at each station was monitored using a tipping bucket type raingage (Belfort Model 5-405A). This instrument recorded rainfall in increments of 0.25 mm (0.01 inches) of precipitation. Both stream stage and rainfall were traced on the same dual pen recorder, which eliminated the problems with synchronizing two separate charts at a later time.

Original attempts to measure flow at stations seven and eight were based upon the Manning equation. Discharge calculations were made using velocity and cross-section area measurements. These results were then used to define a roughness coefficient for use in the Manning equation. Some problems were encountered in using this technique, particularly at site eight. The slope of the pip at site eight was sufficiently steep to create near-critical depth conditions. At times, therefore, transitions from sub- to super-critical flow occurred. This set of conditions made it impossible to make reliable predictions using the Manning equation. Eventually, both these sites were fitted with type-H flumes to provide more reliable flow control.

Discrete samples were collected during storm events by use of an automated sampler (Manning Model 4040), which was activated at desired increments of stage by the flowmeter. An event mark was placed on the flowmeter trace whenever a sample was taken.

The power for operation of each station was provided by a 12 volt, 96 amp-hour, deep cycle marine battery. These batteries were charged and replaced on a weekly schedule. Equipment at each site was housed in a fiberglass enclosure to provide protection both from the weather and curious passersby.

Following a storm event, samples were collected in the field and transported in insulated containers to the laboratory. The recorder strip charts containing both rainfall and runoff records were removed upon sample collection and transported with the samples.

Samples of precipitation and atmospheric dryfall were both collected for analysis. The use of a wetfall/dryfall collector (Aerochem Metrics Model 301), which incorporated a precipitation sensor, allowed for automatic segregation and collection in acid washed polypropylene buckets. During periods of dry weather, the dryfall bucket was exposed to the atmosphere while a "roof" would cover the wetfall bucket. A few raindrops at the start of a storm event caused the movable roof to cover the dryfall bucket and thus expose the wetfall bucket. At the cessation of a rain event, the roof moves back over the wetfall bucket, thus again exposing the dryfall bucket.

Laboratory Analyses

Upon receipt at the laboratory, all samples were placed under refrigeration. The flowmeter records were then generally used to ascertain the stream stage at which each sample was collected. After converting the stage information to units of flow, flow-weighted composite samples were generally prepared for each site. On occasion, the discrete samples were analyzed separately to provide additional information on the relationships between flow, concentration, and loads of selected constituents during storm events.

The focus of the analytical efforts was on nutrient forms. The following determinations were routinely made:

1. total Kjeldahl nitrogen (TKN)
2. soluble Kjeldahl nitrogen (SKN)
3. ammonia nitrogen (NH_3-N)
4. oxidized nitrogen (ox-N), or combined nitrate and nitrite nitrogen
5. ortho phosphorus (OP)
6. total soluble phosphorus (TSP)
7. total phosphorus (TP)
8. total suspended solids (TSS)

All nutrient forms were analyzed using a Technicon Autoanalyzer, and techniques described by Technicon Instruments Company (1974) and the U. S. Environmental Protection Agency (1974).

Other analyses were carried out with less frequency than those identified above. These included biochemical oxygen demand (BOD), chemical oxygen demand (COD), lead, zinc, pesticides and herbicides, and various soil parameters.

A quality assurance (QA) program was an integral part of this study. Use was made of both duplicate and spiked samples to establish limits to be used in conjunction with control chart methodology. Reference samples were also analyzed on a regular basis. A detailed QA program description was submitted to the project officer early in the study period.

RESULTS

During the period from May 15, 1979 through May 31, 1981, a total of 245 storm events were monitored within the station network. As indicated by Table II, the distribution of monitored events was uneven, in both temporal and spatial senses. This uneven distribution was primarily due to the varying precipitation patterns experienced at each site, as well as the inherently different hydraulic efficiencies at the individual sites. Sites seven and eight, which encompassed large impervious areas, and which therefore would be expected to produce more runoff from a given rainfall event, provided over one half of the monitored storm data.

The effects of temporal variations in precipitation are readily apparent. During the first May - April period (1979-80) 126 storms were monitored. During the same period in 1980-81 only 101 were observed. This was a direct result of the lack of precipitation during the latter part of 1980, and during early 1981. The picture becomes even more vivid if one considers only the agricultural and forested sites. During dry conditions even relatively large precipitation events produced little runoff at these locations. Thus, while 79 storm events were observed at these sites during the May - April period during 1979-80, only 28 events were observed in the same period during the following year.

The water quality data collected during each storm event, including the mean flow, are contained in Appendix A-2. Both composite and sequential data are presented. In order to directly compare concentrations among the different storms, the sequential data were manipulated to produce mathematical

Table II. Summary and distribution of storms monitored during study period.

	1979								1980												1981					
SITE	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTALS
1	5	2	3	3	2				2		2		1		1	1	2	1	1			1		1	3	31
2	2			6	2	1			1		1	2		1		1						1			1	19
3					1							1		1												3
4	1	1		5	1	1			1																	10
5	1				1	4			1		2	2										1				12
7		6	1	6	3	5			2	1	2	8	2	2	10	5	2	3	3			2	2	7	10	82
8		1		4								7	1	5	3	4	1	2	3	2		5	1	8	3	50
9		1			2	1			1		3	2	2	1	2				1			4			1	21
10				2	1	5			3		2		1	1								2				17
TOTALS	9	11	4	26	13	17	0	0	11	1	12	22	7	11	16	11	5	6	8	2	0	16	3	16	18	245

composites. These results are in Appendix A-3. In addition to storm event data, weekly samples were collected at stations during baseflow, when such existed. These data are contained in Appendix A-4.

The results of our chemical analyses were usually a representation of flow-weighted concentration (mg/L). This may be interpreted to represent the concentration of the constituent which would be observed if all the runoff had been collected into one homogeneous pot. It may also be thought of as the concentration which, if it remained constant through out the runoff event, would deliver the same total pollutant load as that which was actually measured.

By consideration of flow data, as well as auxillary site information, concentration values can be readily converted into pollutant loadings in terms of mass (kg), mass per unit area (kg/ha), or mass per unit of area and precipitation (kg/ha/cm P). Each of these units of expression can be useful in particular types of analyses. Concentration terms, for example, are useful in determining biological reactivity, while mass terms can be used to evaluate pollutant removal efficiencies. Consideration of area and precipitation data is useful in attempts to directly compare catchments with obvious physical differences. Several of these methods of expressing the data will be utilized, insofar as no single method provides the basis to answer all questions.

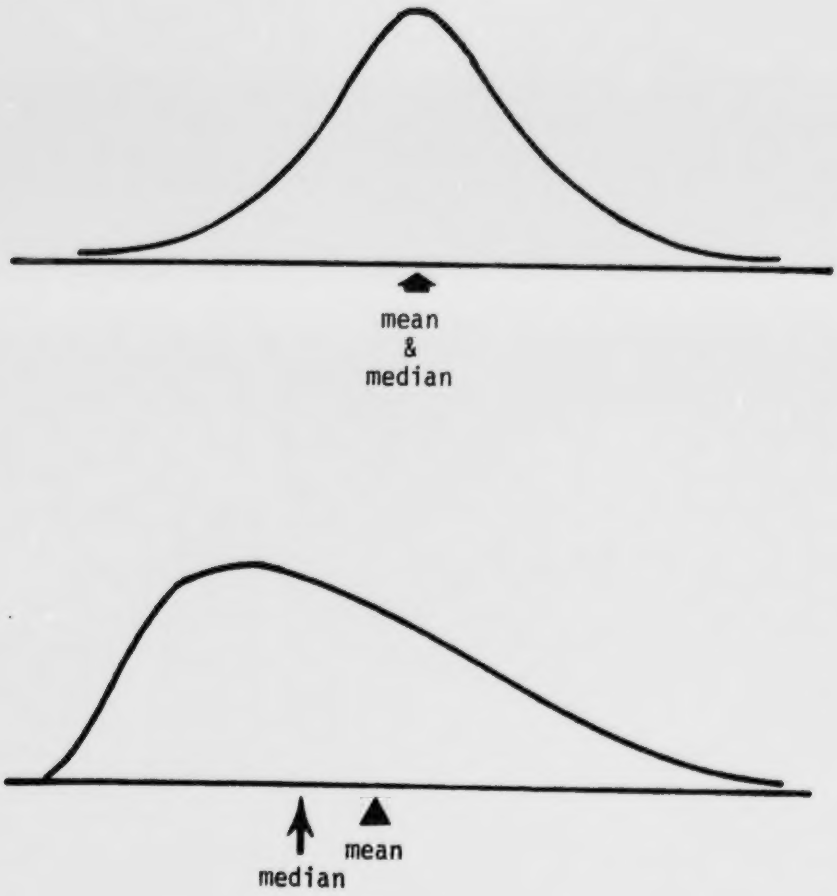
mean
&
median
median
mean

Figure 2. (a) normal distribution (top);
(b) positively skewed distribution (bottom)

Distribution of Data

The data collected in the course of many scientific investigations may be assumed to be normally distributed, i.e., placed along the familar bell-shaped curve (Figure 2a). One measure of normality is the skewness coefficient of the data. For a non-skewed, or normal, distribution, this coefficient will be zero.

A summary of the flow-weighted concentrations measured at the various monitoring stations is in Table III. The wide range of the data is evidenced by the minimum and maximum values shown. Moreover, the skewness coefficients are in general relatively large positive values, indicating a non-normal distribution. The positive skewness coefficients indicate the data distribution is skewed to the right (Figure 2b). Thus, most of the data points were found in the lower range of values. This is a typical finding for hydrologic data sets, and would, therefore, not be surprising in water quality data driven by hydrologic processes. Another property of the distribution shown in Figure 2b is that the mean value is greater than the median value. The median is the value having an equal number of observations on either side.

The skewed distribution of the collected data base has definite implications for any potential statistical treatments. To analyze data from skewed distributions, familiar statistics based upon normal distributions must be abandoned. These statistics use the mean as an estimate of the center of a distribution. For positively skewed distributions the mean has been seriously affected by the infrequent, high values on the upper tail, and no longer estimates the central area of the distribution. To

Table III. Summary of water quality data collected at study sites.

VARIABLE	N	MEAN	MINIMUM VALUE	MAXIMUM VALUE	STANDARD DEVIATION	C.V.	SKEWNESS
			STA=SICB01				
TSS	30	754.72	7.60	3780.00	843.14	111.72	2.03
COD	14	136.66	22.70	277.00	82.89	60.65	0.09
NH3	31	0.34	0.05	2.08	0.39	112.79	3.33
TKN	28	4.58	0.88	17.60	3.74	81.57	1.79
SKN	26	1.36	0.25	4.21	0.84	61.02	1.68
NO23	31	1.48	0.43	3.32	0.61	40.93	0.83
OP	31	0.11	0.01	0.61	0.13	120.17	2.32
TSP	28	0.23	0.03	1.02	0.21	93.37	2.16
TP	28	1.34	0.06	4.80	1.21	89.71	1.32
TZN	1	80.00	80.00	80.00	.	.	.
SZN	1	0.00	0.00	0.00	.	.	.
TFD	1	0.00	0.00	0.00	.	.	.
SFD	1	0.00	0.00	0.00	.	.	.
			STA=SICB02				
TSS	19	282.70	6.00	1126.00	310.44	109.81	1.40
COD	10	56.18	17.20	95.00	28.19	50.17	0.11
NH3	19	0.22	0.05	0.85	0.18	80.90	2.46
TKN	18	3.06	0.88	8.65	2.04	66.61	1.37
SKN	17	1.27	0.38	3.76	0.84	66.37	2.21
NO23	19	3.88	0.70	13.40	3.46	89.21	1.72
OP	19	0.16	0.01	0.69	0.17	107.85	1.88
TSP	17	0.21	0.05	0.77	0.19	89.59	1.74
TP	17	0.78	0.12	2.55	0.76	97.03	1.30
TZN	1	20.00	20.00	20.00	.	.	.
SZN	1	0.00	0.00	0.00	.	.	.
TFD	1	0.00	0.00	0.00	.	.	.
SFD	1	0.00	0.00	0.00	.	.	.
			STA=SICB03				
TSS	3	35.53	4.60	57.00	27.45	77.26	-1.37
COD	2	132.30	57.60	207.00	105.64	79.85	.
NH3	3	0.86	0.26	1.95	0.95	110.60	1.71
TKN	3	3.88	1.89	5.72	1.92	49.44	-0.36
SKN	3	2.77	1.71	4.58	1.58	57.02	1.66
NO23	3	0.46	0.24	0.84	0.33	71.84	1.67
OP	3	0.64	0.54	0.71	0.09	13.89	-1.35
TSP	3	0.96	0.68	1.26	0.29	30.13	0.21
TP	2	1.17	0.76	1.58	0.58	49.56	.
TZN	0	.	.	.	.	.	.
SZN	0	.	.	.	.	.	.
TFD	0	.	.	.	.	.	.
SFD	0	.	.	.	.	.	.

Table III. (con't)

VARIABLE	N	MEAN	MINIMUM VALUE	MAXIMUM VALUE	STANDARD DEVIATION	C.V.	SKEWNESS
STA=SIC004							
TSS	10	140.10	14.00	372.00	108.80	77.66	1.17
COD	3	49.70	20.70	67.90	25.39	51.08	-1.57
NH3	10	0.70	0.11	2.34	0.48	76.24	1.90
TKN	10	4.31	0.84	5.04	1.76	40.92	-1.10
SKN	10	2.07	0.60	3.92	0.98	47.40	0.04
NO23	10	0.85	0.29	3.23	0.86	101.07	2.05
OP	10	0.06	0.03	0.09	0.02	42.21	0.32
TSP	9	0.12	0.07	0.23	0.06	45.07	1.54
TP	9	0.45	0.10	0.95	0.24	53.90	0.99
TZN	1	0.00	0.00	0.00	.	.	.
SZN	1	0.00	0.00	0.00	.	.	.
TPB	1	0.00	0.00	0.00	.	.	.
SPB	1	0.00	0.00	0.00	.	.	.
STA=SIC005							
TSS	12	119.81	3.00	845.00	234.41	195.66	3.16
COD	4	74.87	33.00	150.00	53.00	70.79	1.42
NH3	12	0.21	0.09	0.67	0.15	71.96	2.60
TKN	11	1.70	0.69	4.89	1.16	68.03	2.43
SKN	11	0.93	0.57	1.33	0.24	26.21	0.25
NO23	12	0.27	0.01	0.71	0.21	78.57	1.00
OP	12	0.06	0.00	0.18	0.05	93.04	1.19
TSP	9	0.11	0.04	0.36	0.11	93.75	2.02
TP	9	0.36	0.07	1.16	0.35	97.64	1.02
TZN	1	0.00	0.00	0.00	.	.	.
SZN	1	0.00	0.00	0.00	.	.	.
TPB	1	0.00	0.00	0.00	.	.	.
SPB	1	0.00	0.00	0.00	.	.	.
STA=SIC007							
TSS	80	181.44	11.00	1076.00	212.24	116.97	2.47
COD	26	61.72	12.00	166.00	39.98	64.78	1.19
NH3	82	0.56	0.04	26.82	2.93	520.10	8.76
TKN	79	1.72	0.47	8.97	1.26	73.37	3.03
SKN	81	0.78	0.30	2.67	0.44	56.04	2.48
NO23	82	0.71	0.12	4.06	0.51	72.65	3.85
OP	79	0.08	0.00	3.18	0.36	433.23	8.67
TSP	79	0.08	0.03	0.30	0.06	71.68	2.04
TP	80	0.34	0.00	1.61	0.28	82.58	2.14
TZN	2	40.00	30.00	50.00	14.14	35.36	.
SZN	2	22.50	20.00	25.00	3.54	15.71	.
TPB	2	42.50	0.00	85.00	60.10	141.42	.
SPB	2	0.00	0.00	0.00	0.00	.	.

Table III. (con't)

STA=SICD08

VARIABLE	N	MEAN	MINIMUM VALUE	MAXIMUM VALUE	STANDARD DEVIATION	C.V.	SKEWNESS
TSS	45	268.29	25.00	3209.00	478.01	178.17	5.52
COD	20	50.87	4.00	212.00	47.07	92.52	2.48
NH3	44	0.26	0.00	1.20	0.19	75.97	7.80
TKN	42	1.72	0.41	7.88	1.46	85.03	2.70
SKN	42	0.73	0.22	2.10	0.34	47.15	2.32
NO23	43	0.69	0.20	2.54	0.43	62.16	2.54
OP	43	0.04	0.00	0.27	0.05	118.96	2.61
TSP	38	0.05	0.02	0.20	0.04	71.25	2.72
TP	42	0.33	0.05	1.25	0.30	89.45	1.73
TZN	0	.	.	.	.	.	.
SZN	0	.	.	.	.	.	.
TPB	0	.	.	.	.	.	.
SPB	0	.	.	.	.	.	.
STA=SICD09							
TSS	21	150.99	6.00	935.00	226.90	150.27	2.54
COD	8	37.47	9.00	87.80	24.93	66.52	1.16
NH3	21	0.13	0.02	1.05	0.22	170.07	4.00
TKN	21	1.25	0.20	4.52	1.31	105.21	1.61
SKN	20	0.46	0.12	2.10	0.42	91.27	3.31
NO23	21	0.21	0.05	0.52	0.12	58.95	1.16
OP	20	0.02	0.00	0.07	0.02	88.21	1.56
TSP	21	0.05	0.02	0.08	0.02	40.89	0.01
TP	21	0.30	0.04	1.37	0.39	131.69	1.95
TZN	1	0.00	0.00	0.00	.	.	.
SZN	1	0.00	0.00	0.00	.	.	.
TPB	1	0.00	0.00	0.00	.	.	.
SPB	1	0.00	0.00	0.00	.	.	.
STA=SICD10							
TSS	17	360.89	15.10	1830.00	496.46	137.56	2.08
COD	4	239.40	41.10	784.00	363.27	151.74	1.99
NH3	17	0.43	0.11	3.80	0.87	204.88	4.05
TKN	17	4.51	1.12	32.30	7.34	162.77	3.80
SKN	17	1.46	0.68	4.32	0.93	63.52	2.37
NO23	17	8.77	0.80	70.56	16.74	190.79	3.54
OP	17	0.16	0.05	0.24	0.05	32.63	-1.02
TSP	13	0.20	0.10	0.39	0.07	36.67	1.32
TP	15	1.28	0.20	8.75	2.14	167.31	3.43
TZN	1	20.00	20.00	20.00	.	.	.
SZN	1	0.00	0.00	0.00	.	.	.
TPB	1	0.00	0.00	0.00	.	.	.
SPB	1	0.00	0.00	0.00	.	.	.

overcome this problem, non-parametric or distribution-free statistics can be used. These tests assume no shape for the population distribution, and are therefore valid for both normal and skewed distributions (Hollander and Wolfe, 1973). Non-parametric statistical tests will be discussed again as they are used.

When considering a non-normal distribution it is useful to depict the range of the data, in addition to a measure of central tendency, such as the median. A graphical presentation called a "box and whisker" diagram can be used to visualize such data more clearly (Figure 3). The box in such a figure is composed of the 25th, 50th, and 75th percentiles of the collected data. The 50th percentile is, of course, the median value noted earlier. The vertical whiskers show the relation of the extreme values to the remainder of the data set. The mean value of the data is also indicated in the figure by a cross. Extensive use will be made of such plots in this text.

Uncertainty of Measurements

A concern with all quantitative results of scientific inquiry is how reliably they reflect the actual situation. It is important that those who utilize the numbers produced from such studies recognize their inherent limitations. Many of the limitations are based upon the experimental design. Extrapolation of data beyond the circumstances under which they were taken, for example, always entails a risk. But beyond this consideration, there is also the matter of accuracy in the measurement techniques employed. A knowledge of the uncertainty which might be expected in these measurements can help others in the judicious use of the data. Perhaps it would be help-

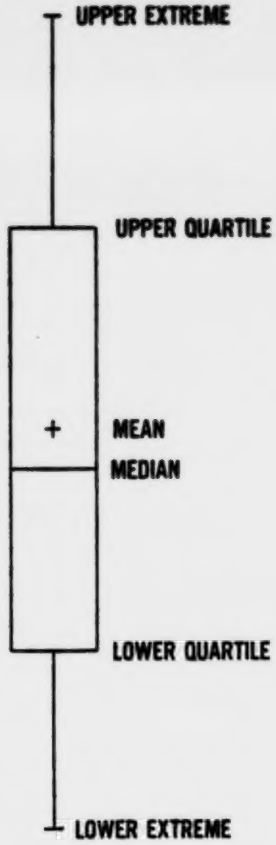
UPPER EXTREME
UPPER QUARTILE
MEAN
MEDIAN
LOWER QUARTILE
LOWER EXTREME

Figure 3. Interpretation of a box-and-whisker plot.

ful to briefly comment on these problems here. Of particular concern in the present work is the calculation of pollutant loadings for the various storm events. The loading calculations were based upon three factors: concentration, flow and duration. It would be appropriate to take a moment here to evaluate the relative errors to be anticipated in each of these measurements.

Concentration data collected during this study was the result of chemical analyses. Assuming the sample delivered to the laboratory was indeed representative, the error in the reported concentrations would be dependent wholly on the methodology employed, the analytical equipment, and the technician. The relative error would further depend upon the concentration found. For example, if an oxidized nitrogen analysis is precise with 0.01 mg/L, this would represent a one-half percent error on a total concentration of 2.00 mg/L, but a two percent error in a total concentration of 0.50. And other constituents with similar precision may be present to a much lesser extent. At a concentration of 0.05 mg/L the relative error would increase to 20 percent.

Flow measurements are the second factor in load calculations. Most investigators feel these measurements are subject to many inaccuracies. Although the instruments were routinely calibrated and checked in the field, changes in the flow regime and conditions affecting the orifice produce irregularities in the record. In addition, there are uncertainties in the calibration of the primary device to be considered. No weir or flume can be expected to provide an absolutely accurate or precise relationship between stage and discharge under all conditions. Accordingly, uncertainties in the range of 10-20 percent would not be considered unusual.

The time factor provided another variable. The chart drive mechanism in the recorders sometimes slowed as battery power decreased. The correction for this variation assumed a linear relationship, which may not be truly applicable. It is difficult to estimate the error here, but it was probably less than ten percent.

As an example of what this could mean to load calculations for a single storm we could consider an actual situation. Storm number 299 at site 7 had a reported mean flow of 7.11 cfs, a duration of 6.0 hours and a mean total phosphorus concentration of 0.70 mg/L. Multiplication of these numbers, along with appropriate conversion factors yields a loading in pounds:

$$(7.11\ \frac{ft^3}{sec})\ (6.0\ hrs)\ (\frac{3600\ sec}{hr})\ (0.70\ \frac{mg}{L})\ (\frac{28.32\ L}{ft^3})\ (\frac{lb}{454{,}000\ mg})$$

$$= 6.71\ lbs$$

In order to estimate the uncertainty in this calculation we can consider the uncertainty in the component factors. Assume for our purposes a possible error of 15 percent in the flow value, five percent in the time factor and five percent in the concentration value. A low and a high loading estimate can then be made.

$$\text{LOW}\ \ (6.04\ \frac{ft^3}{sec})(5.7\ hrs)(3600\ \frac{sec}{hr})(0.67\ \frac{mg}{L})(\frac{28.32L}{ft^3})(\frac{1\ lb}{454{,}000\ mg})$$

$$= 5.18\ lbs$$

$$\text{HIGH}\ (8.18\ \frac{ft^3}{sec})(6.30\ hrs)(3600\ \frac{sec}{hr})(0.74\ \frac{mg}{L})(\frac{28.32L}{ft^3})(\frac{1\ lb}{454{,}000\ mg})$$

$$= 8.56\ lbs$$

From these calculations an estimate can be made that the actual load of phosphorus carried in this storm was probably between 5.18 lbs. and

8.56 lbs. The lower estimate is about 23 percent less than the first calculation yielded. The high estimate is about 28 percent more than the original calculation.

The above analysis is a simplified one, based only upon the uncertainties which might be expected in the data base. It is not a worst case situation. Yet it indicates an uncertainty of 25-30 percent can be expected in the load calculations. In certain instances uncertainties even twice this might be imagined.

Note again that none of the above considers the problems inherent in sampling the environment. Were the samples representative of the storms? Were the number and size of the events monitored representative of typical conditions? Obviously, the data must be evaluated with all these things in mind. Despite what the calculator might tell us, it can in no way be concluded that a storm transported 2250.6672 lbs of solids through a monitoring station.

Overall Site Comparisons

The sites selected for this study collected runoff from catchments displaying different land uses:

1. Pastureland: sites 1 and 5
2. Corn cropland: sites 2 and 10
3. Suburban development: site 7
4. Hardwood forest: site 9

Examination of the data collected at these locations should indicate to some degree the differences to be expected from various land uses. However, the comparisons drawn from the data are of necessity comparisons of the study sites, rather then of land uses, _per se_. Factors other than land use certainly affect runoff water quantity and quality. These other factors include soil type and slope, among other physical characteristics that may differ from site-to-site, within a given land use. Of course, the study sites were selected as best possible to minimize these other effects, but they still remain, and in an unquantified manner.

Nutrients

The emphasis in this study was upon the examination of nutrient export from the various catchments. In addition to the phosphorus and nitrogen species analyzed, TSS may also be included in this grouping, because many nutrients are carried in runoff in a particulate form.

The most directly measured indicator of pollution levels was that of chemical concentration. It is somewhat difficult to use this unit of expression for comparison, because the variations seen in any given parameter at a single site was great. A variation of two orders of magnitude was not unusual among runoff events at the same site. Under these circumstances an arithmetic mean value would be misleading, since the population distribution of parameter concentrations is not at all normal in a statistical sense. If a single number was desired for comparative purposes, the median would probably be the best choice. This is the value which is midway in the data, distribution, i.e., there are an equal number of data points higher and lower than the median value.

Median values for pollutant concentrations measured at the various sites are given in Table IV. It can be generally observed from these data that the croplands produced relatively high nutrient concentrations in stormwater runoff. Often the concentrations at these sites were the highest median values observed. The use of commercial fertilizers and animal manure on such lands obviously contributed to the nutrient levels observed in runoff from these catchments.

It is notable that TSS, TKN and TP concentrations were generally higher at the heavily grazed pastureland (site 1). This may reflect the erodable nature of the soils at this site, because both TKN and TP include the contributions of particulate nutrient forms. That these high values do not represent pasturelands in general is evidenced by the vary low concentrations recorded at the lightly grazed pastureland (site 5).

As one would expect, the hardwood forest (site 9) produced the lowest pollutant concentrations. This can be related to the abundance of ground cover, forest canopy and general lack of soil disturbance within the catchment. It is interesting to note the median TSS concentration at this site is but one-third or less of that measured at the other sites. This provides some indication of the changes which could be expected as forested

Table IV. Median concentration of pollutants in runoff from different land use areas.

	Median concentration, mg/L								
Site	TSS	NH_3-N	TKN	SKN	ox-N	TN	OP	TSP	TP
1	502	0.18	3.56	1.13	1.45	5.10	0.05	0.16	1.14
2	144	0.19	2.71	1.04	2.49	4.96	0.08	0.12	0.45
5	41	0.18	1.35	0.93	0.19	1.77	0.05	0.07	0.22
7	118	0.16	1.34	0.67	0.61	1.90	0.03	0.06	0.25
9	52	0.06	0.60	0.37	0.18	0.81	0.02	0.04	0.12
10	168	0.21	2.25	1.19	3.40	6.33	0.18	0.20	0.59

lands undergo development.

Although the median is very useful in considering non-normal distributions of data, a single number naturally cannot convey a complete picture provided by the entire data base. The additional information illustrated by a box and whisker diagram is apparent in Figure 4. This particular plot presents TP concentrations at the various sites. The TP information previously shown in Table IV appears as the middle bar in Figure 4. Site 9 has the lowest median value; sites 1 and 10 have the highest median values. However, it is also apparent now that the largest single concentration of total phosphorus occurred at site 10. Perhaps the greatest advantage in this style of presentation is the feel one gets for the data distribution. The range of values at site 10, for example, was over an order of magnitude. One good measure of variability is the interquartile range, which is represented by the box height on the plot (Holman, 1981). The larger the box, the greater the variability. Thus, site 10 showed a great variability in total phosphorus concentrations, whereas site 7 showed relatively little.

The most variable data among the parameters analyzed are those associated with total suspended solids (Figure 5). Nearly a ten-fold variation was observed just within the interquartile range, and considerably more than this overall. This is related to the innate heterogeneous nature of solids in solution, as well as to the physical nature of the process which control erosion during storm events.

There were also differences among the sites in the variability of data. For example, sites 1, 2 and 10 were generally among the most variable for any given parameter. This was not merely a reflection of the number of

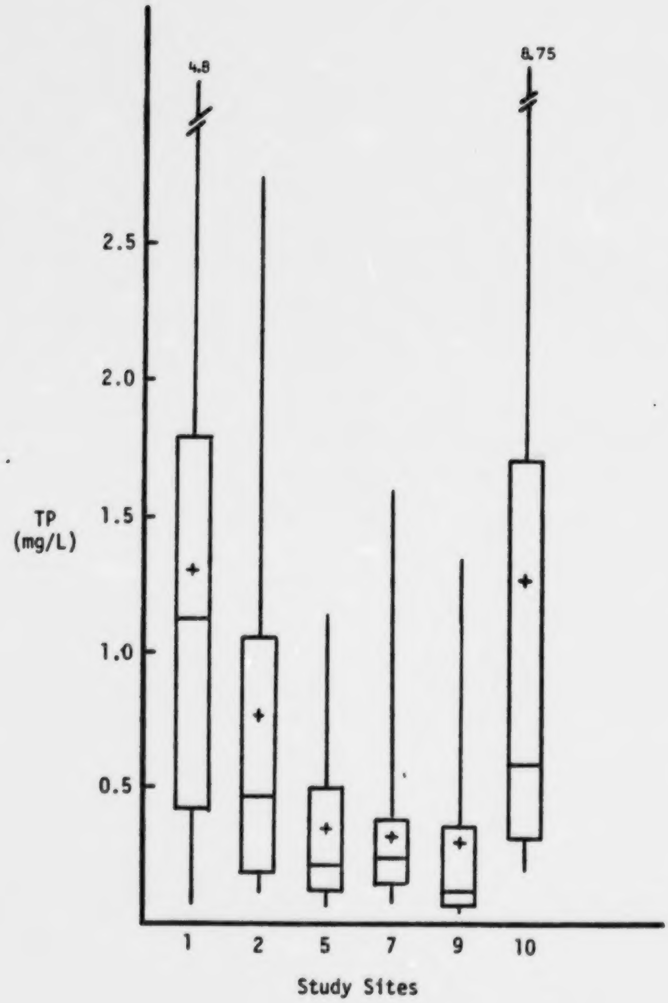

Figure 4. Total phosphorus concentrations observed at study sites.

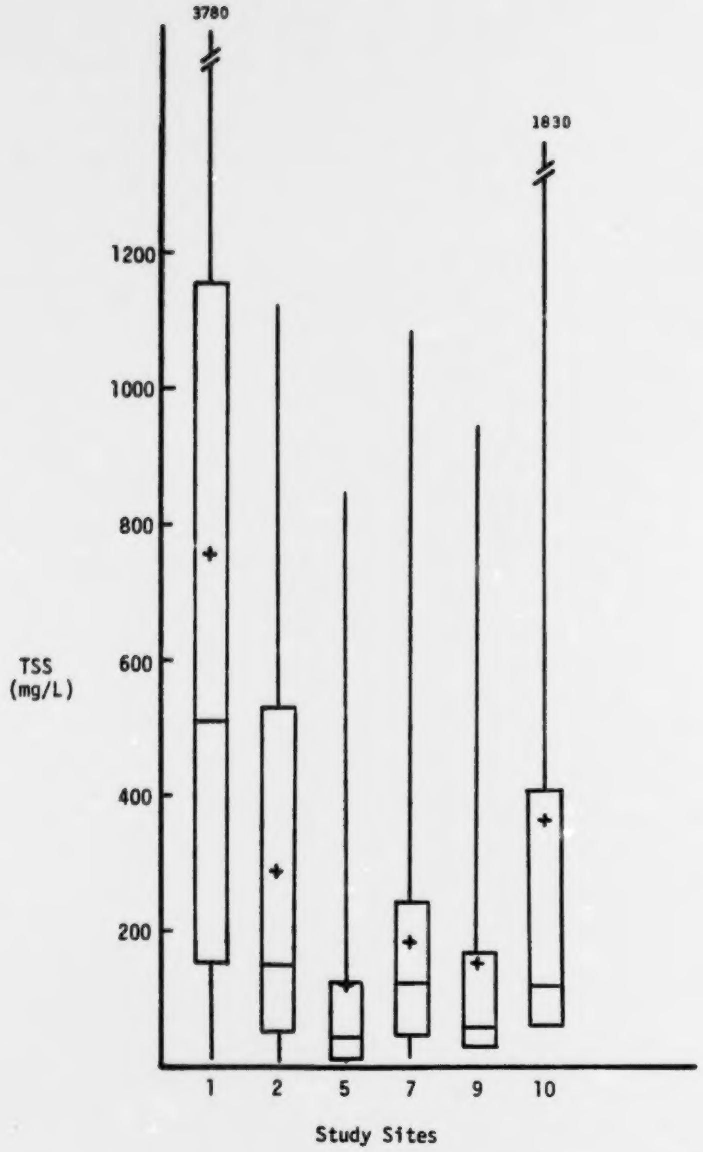

Figure 5. Total suspended solids concentrations at study sites.

events sampled. Sites 2 and 9 were sampled during approximately the same number of events, yet show greatly different variabilities. Site 7 was sampled more than any other, and showed relatively small variabilities. The latter instance may be a reflection on the unchanging nature of the catchment, since a good portion is impervious in nature. The cropland sites (2 and 10) are more disturbed by man, and changed seasonally as the planting-growing-harvesting cycle proceeded.

The median concentrations of soluble components do not vary as greatly from site to site. This can be seen by review of Table IV, or by looking at the bar graphs for NH_3, SKN, O-P and TSP (Figures 6, 8, 11 and 12). This may be a reflection of the limited amount of soluble material available, the solubility of the various constituents, or other basic chemical principles which control the solution and transport of these materials. One exception appears to be oxidized nitrogen (Figure 9). Particularly high concentrations were found at the cropland sites. This might be attributed to the use of fertilizers and manure, which increases the availability of nitrate. Because such fertilizer applications are seasonal in nature, the variability in nitrate concentrations observed might be expected to be higher at these sites. That this is true can also be observed in Figure 9. The slightly elevated median concentration of oxidized nitrogen at site 1 might reflect the manure contributions from grazing animals.

It might be pointed out that some researchers prefer to analyze pollutant effects in terms of kilogram per hectare per centimeter of runoff. It should be realized that such terms are in reality concentration units. In fact, multiplication of pollutant concentration in mg/L by the conversion factor of 0.1000 will yield units of kg/ha/cm Q. Because of this identity,

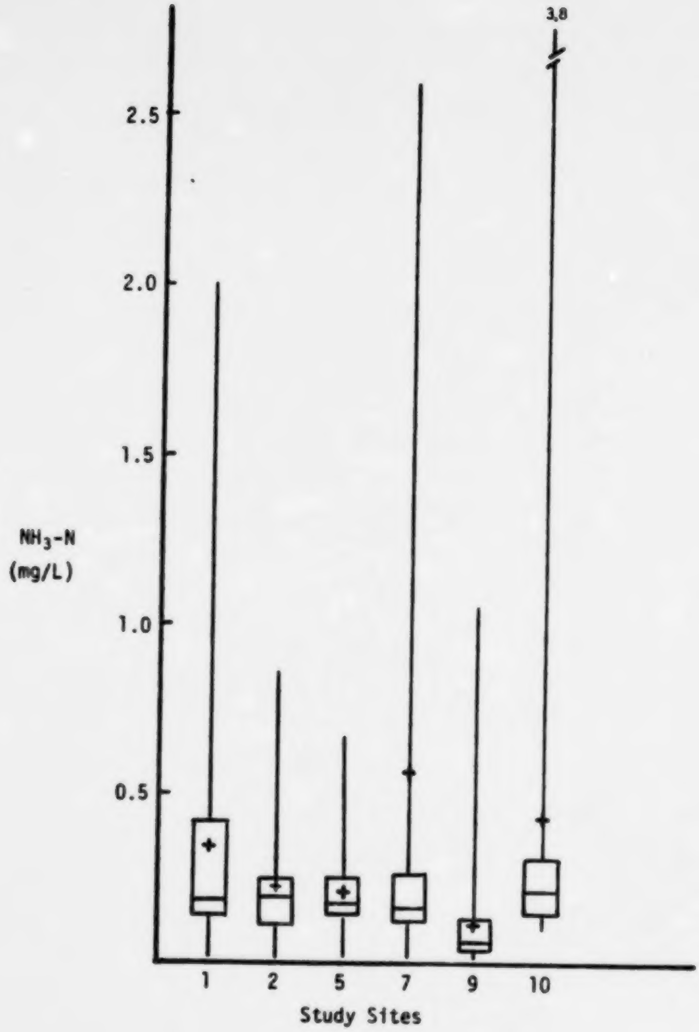

Figure 6. Ammonia concentrations at study sites.

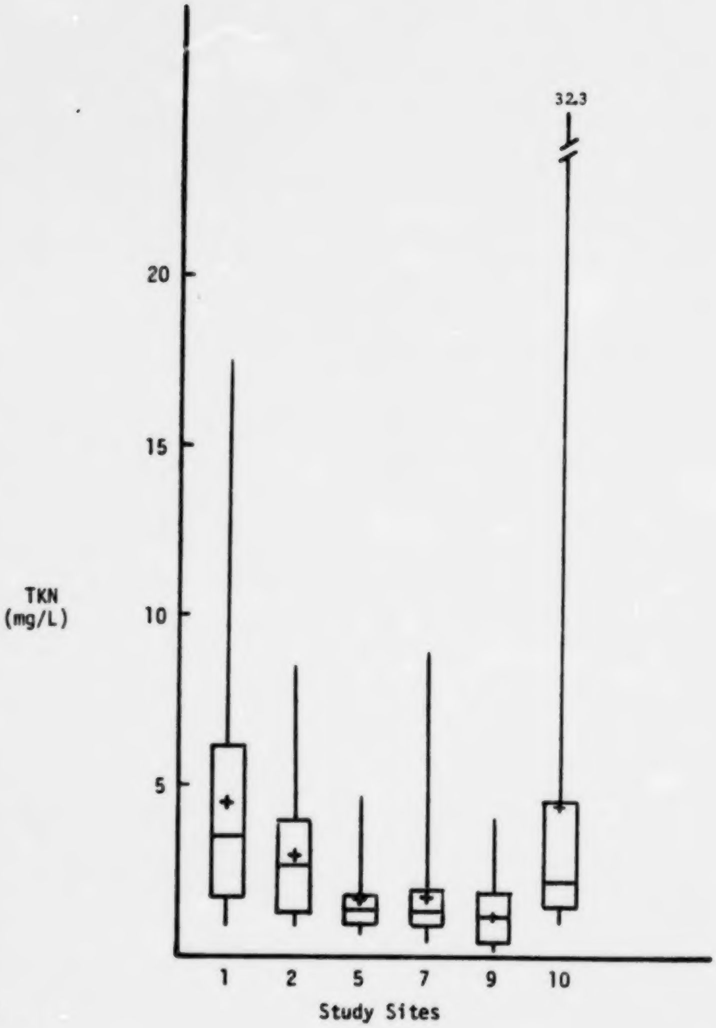

Figure 7. TKN concentrations at study sites.

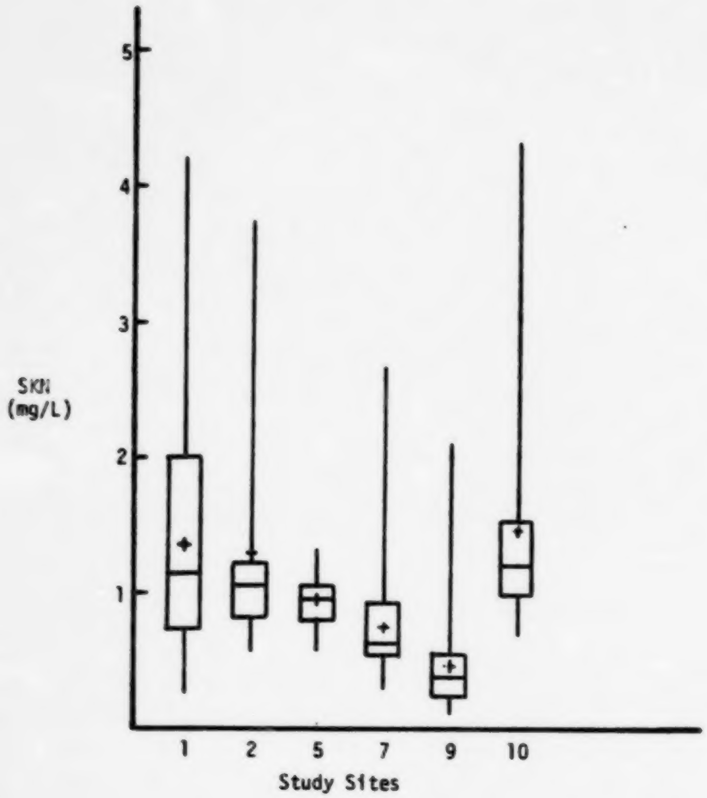

Figure 8. Soluble Kjeldahl nitrogen concentrations at study sites.

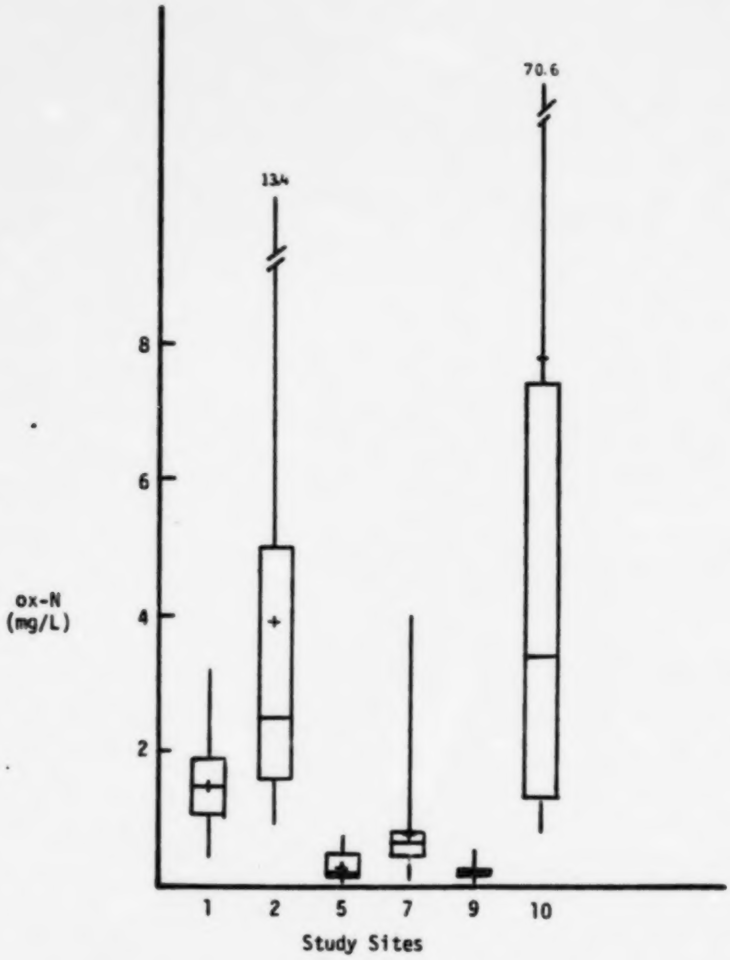

Figure 9. Oxidized nitrogen concentrations at study sites.

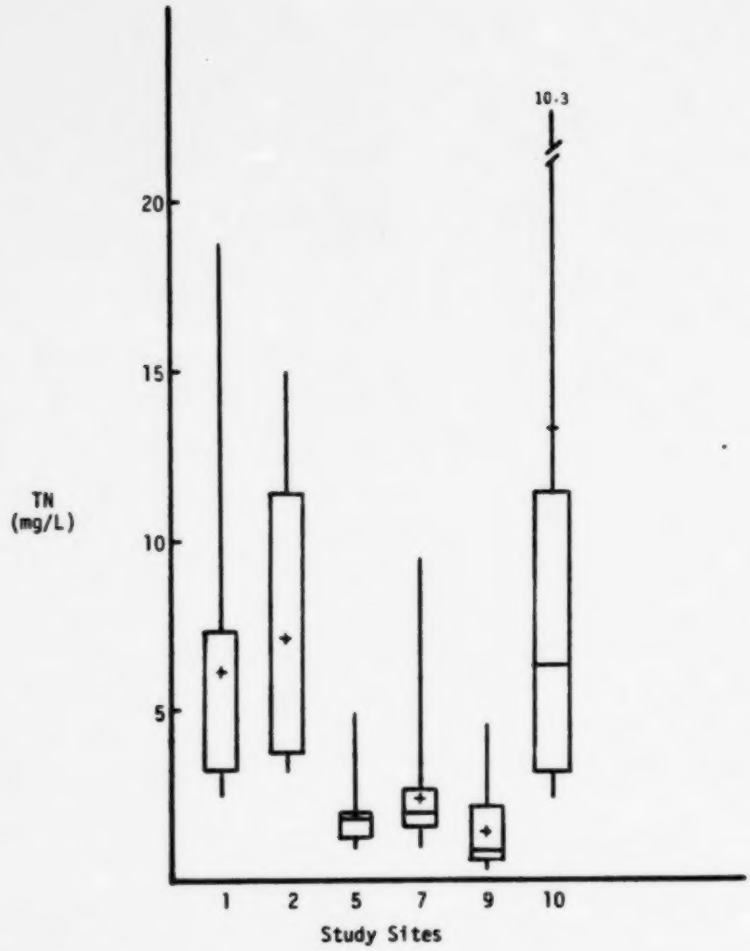

Figure 10. Total nitrogen concentrations at study sites.

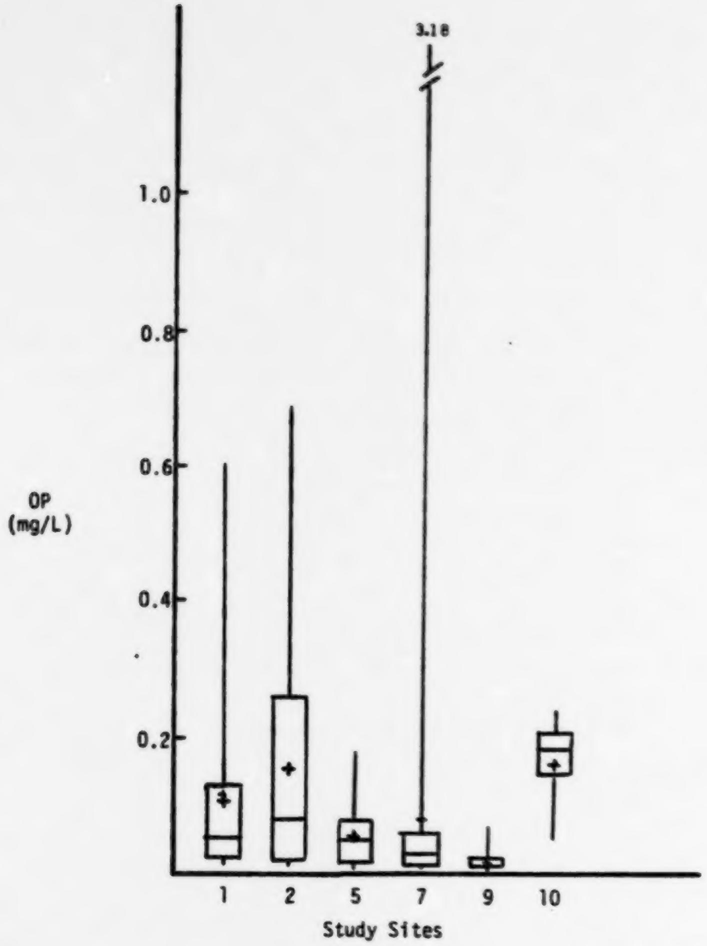

Figure 11. Ortho-phosphorus concentrations at study sites.

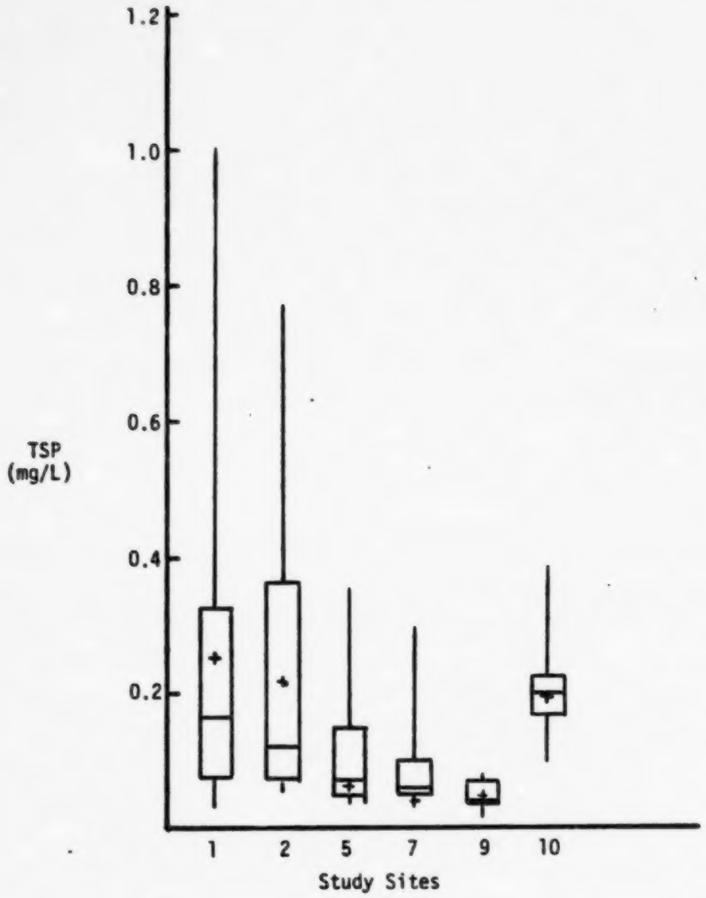

Figure 12. Total soluble phosphorus concentrations at study sites.

and because mg/L is the basic laboratory unit reported, only mg/L will be used in this report. Any conclusions concerning the concentrations or range of concentrations found at the study sites would, of course, be independent of the units of expression chosen.

Of course, the concentration of pollutants in runoff is not the only concern. The total load delivered should also be considered. The product of mean concentration, mean flow and runoff duration yields the mass of pollutants delivered. To account for differences in drainage areas and in precipitation received these masses may be converted to loadings in units of kilograms per hectare per centimeter of precipitation (kg/ha/cm P).

For purposes of comparison it is again useful to consider median values. Table V indicates both median and mean loading rates at the various sites. The highest median values generally appear at the heavily grazed pasture (site 1) and at the suburban catchment (site 7). The lightly grazed pasture and forest sites (5 and 9) generally exhibit the lowest loading rates.

The mean value is nearly always higher than the median. This can be explained simply by the distribution of precipitation events. There are manay more smaller storms than larger ones. The loadings from smaller storms would of course also be relatively low, and this would tend to lower the median loading value. Moreover, even one very large storm could inflate the mean value greatly.

The TSS loading plot (Figure 13) more completely details the order observed in Table V. The highest value recorded was 59.1 kg/ha/cm P, at site 7, the lowest was 9.49×10^{-4} kg/ha/cm P at site 2. The variability at any given site is great, as any be observed from the interquartile range. Perhaps the least variability was at site 7, and even that fluctuated by a

Table V. Median and mean pollutant loadings, grams per hectare per centimeter precipitation. Divide listed value by 1000 to obtain units of kg/ha/cm P.

Site	Median/mean								
	TSS	NH_3-N	TKN	SKN	ox-N	TN	OP	TSP	TP
1	1170 5960	1.06 3.55	16.5 39.1	6.05 13.3	5.96 11.9	22.4 52.1	0.234 0.755	7.81 18.6	4.32 10.9
2	168 4810	0.228 2.10	7.63 40.0	4.72 15.09	4.17 64.9	10.6 109	0.187 1.93	0.338 2.22	1.17 11.5
5	126 658	0.799 1.05	8.87 10.9	7.55 6.58	0.750 2.02	9.84 13.1	0.155 0.388	0.309 0.346	0.635 1.55
7	1540 4940	2.34 7.42	23.5 42.7	11.2 18.3	9.97 17.9	37.1 60.9	0.420 1.46	0.909 1.91	4.21 8.25
9	583 1300	0.710 1.38	4.46 14.0	2.80 4.68	1.53 1.79	7.24 15.8	0.137 0.257	0.307 0.463	1.06 3.63
10	472 2300	1.33 1.90	12.0 21.2	7.37 10.7	17.0 30.7	37.5 52.1	0.856 1.62	1.73 1.98	2.99 5.34

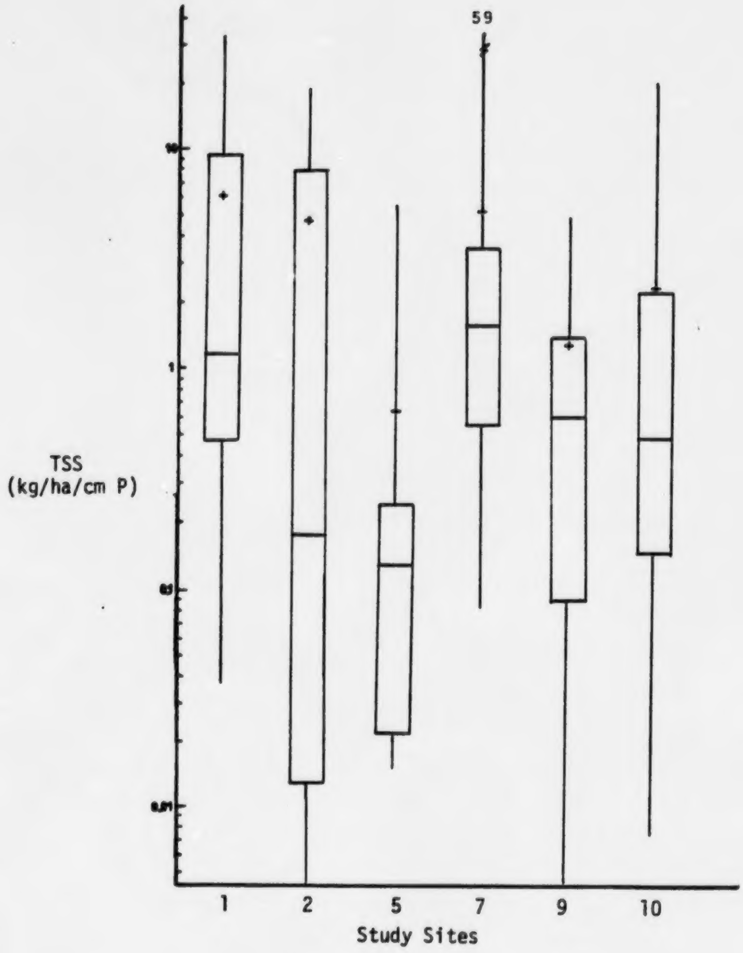

Figure 13. Areal loadings of total suspended solids observed at study sites, per cm of precipitation.

factor of six. This smaller variability at site 7 may be indicative of a more constant input from impervious surfaces. Agricultural catchments may undergo more intermittent disturbances which result in greater variabilities.

Figure 14 shows the observed loadings of total nitrogen at the study sites. Values range from only 7.10 x 10^{-5} kg/ha/cm P at site 10 to a maximum of 0.847 kg/ha/cm P at site 7. It is interesting that the median loading at the suburban site (site 7) is as high as, or even higher than, those at the cropland sites (2 and 10), because nitrogen fertilizers and manure were spread in the latter catchments. Perhaps this is in part a reflection on the use of fertilizers in the suburban environment. Both the forest (site 9) and the lightly grazed pasture (site 5) exhibited low median values.

The loadings rates for the total phosphorus (Figure 15) show the same pattern as has been shown with TSS and TN. The highest rate (site 7) was 1.78 x 10^{-2} kg/ha/cm P, while the lowest was 1.29 x 10^{-5} kg/ha/cm P (site 10).

The three parameters just discussed - TSS, TN and TP - are related directly to the particulate loading. To represent the relationship of soluble pollutant loadings, box plots for ox-N and TSP were also prepared (Figures 16 and 17). The same general pattern emerged. The highest median loadings were generally at sites 1, 7 and 10; the lowest loadings were at sites 5 and 9. It is of some interest that the variability of the loadings rates for these soluble constituents, although large, is less than those involving particulate fractions.

McTernan (1980) noted that calculated loading rates (kg/ha/cm P) were variable, and in part dependent upon storm size. This is illustrated by

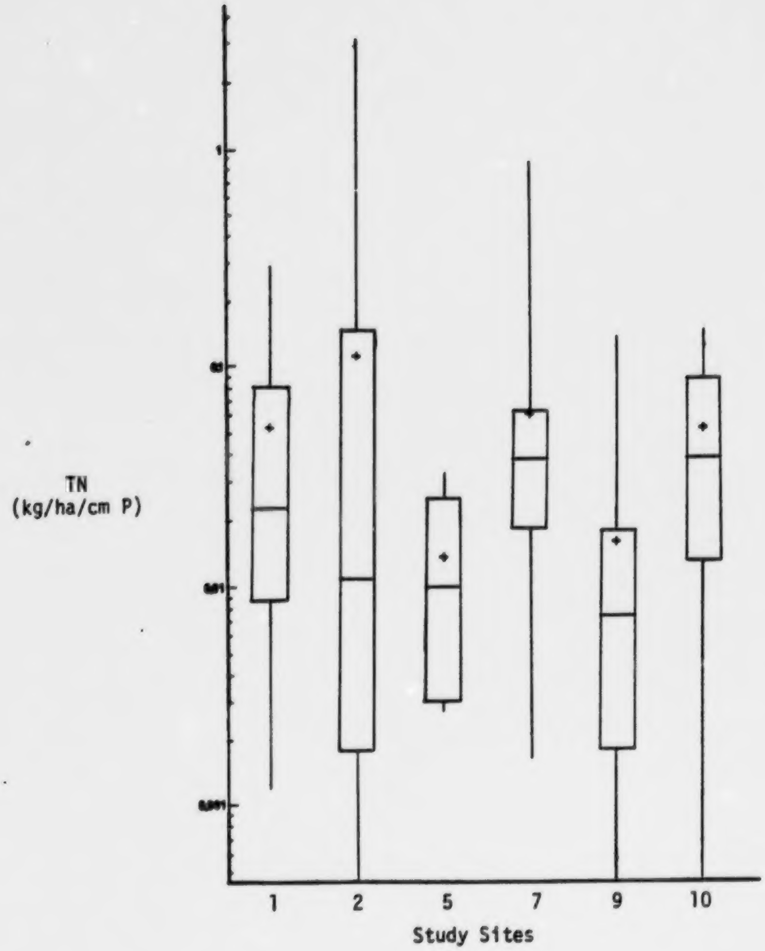

Figure 14. Areal loadings of total nitrogen observed at study sites, per cm of precipitation.

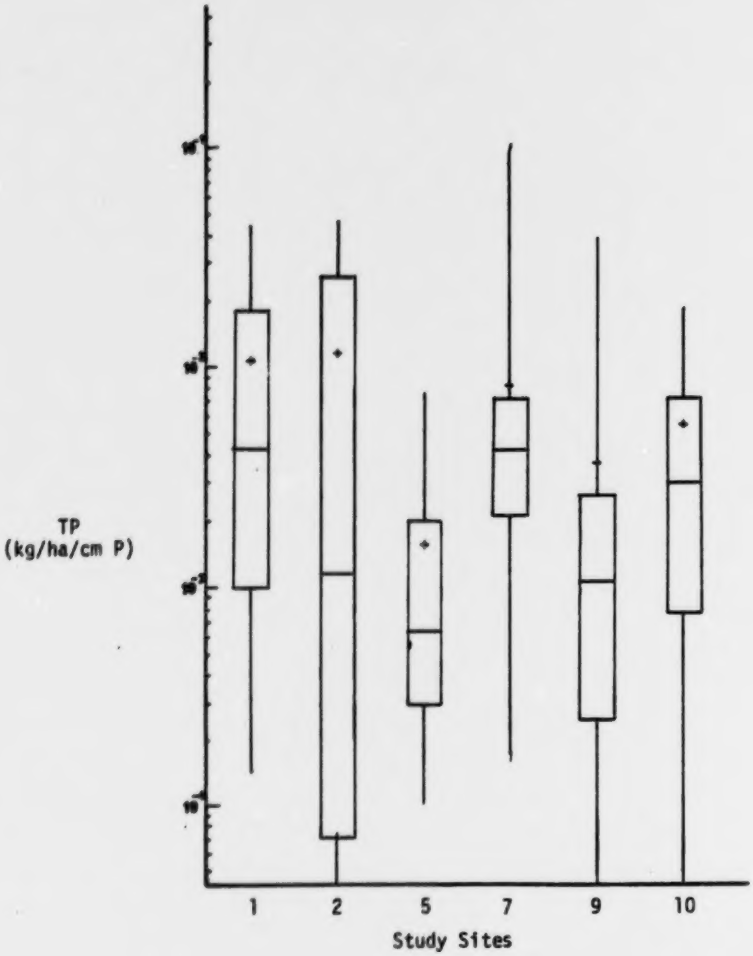

Figure 15. Areal loadings of total phosphorus observed at study sites, per cm of precipitation.

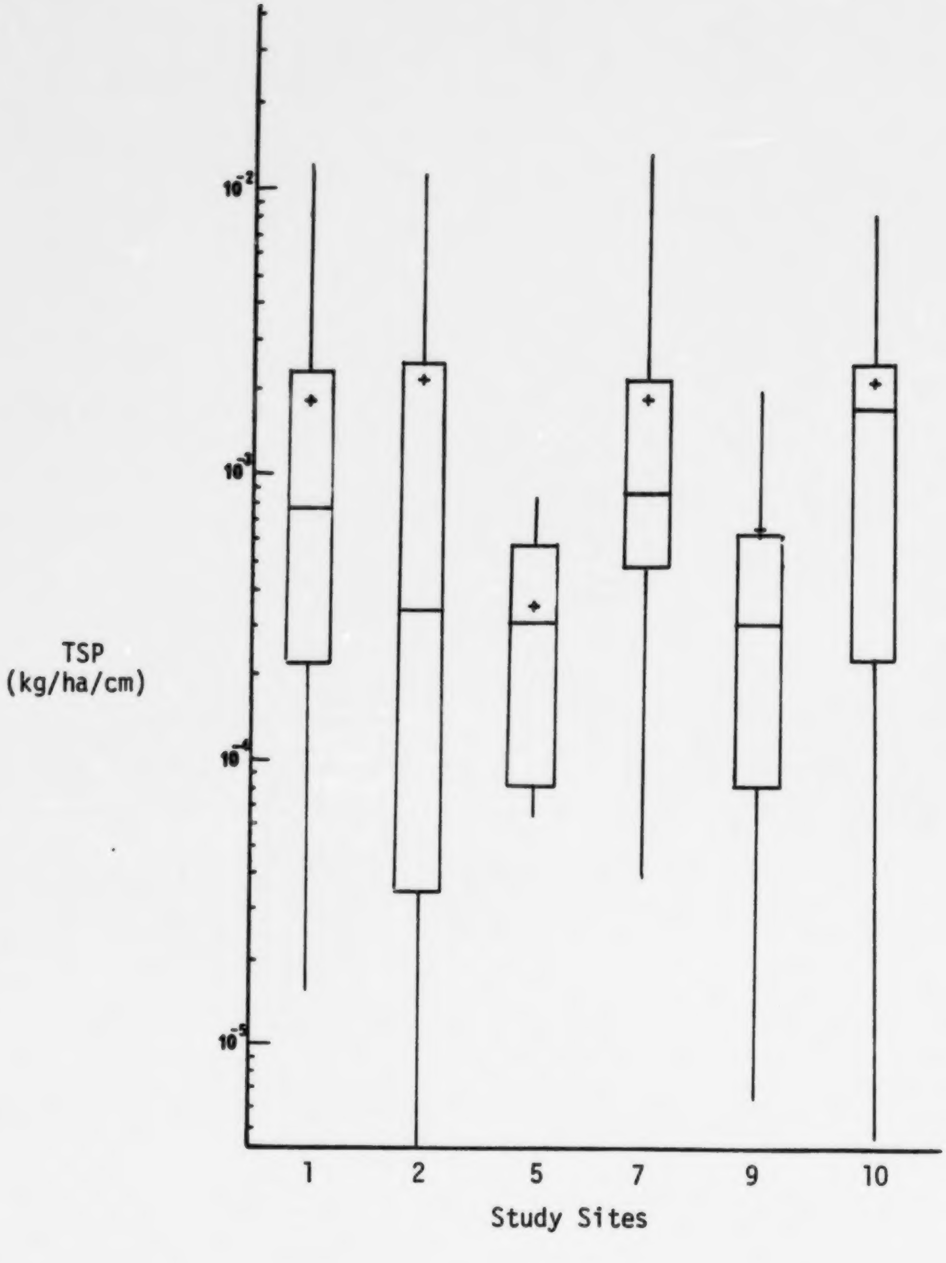

Figure 16. Areal loadings of total soluble phosphorus observed at study sites, per cm of precipitation.

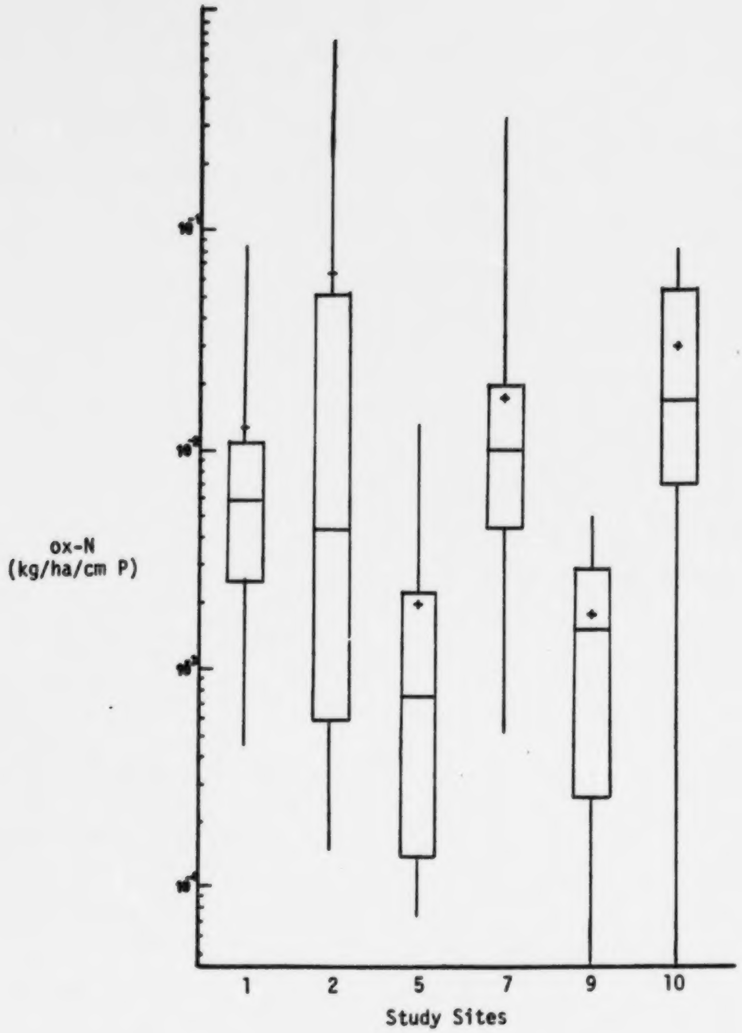

Figure 17. Areal loadings of oxidized nitrogen observed at study sites, per cm of precipitation.

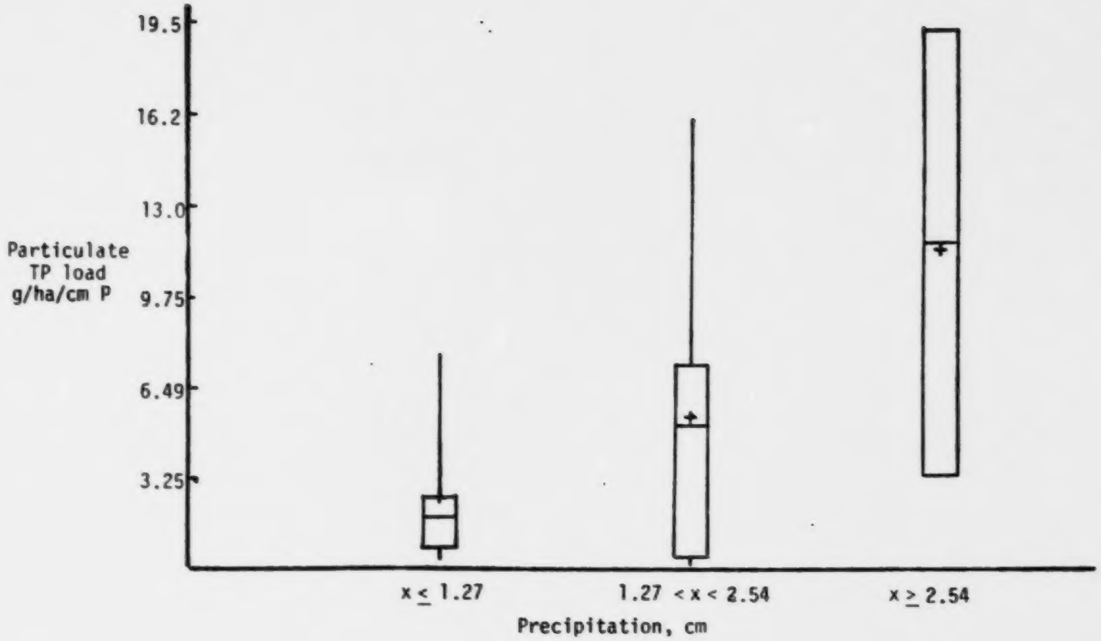

Figure 18. Variation of total particulate phosphorus loading with storm size at site 10.

Figure 18, wherein box plot loadings for three different ranges of rainfall are displayed. The categories into which rainfall events were arbitrarily divided were less than 1.27 cm, between 1.27 - 2.54 cm, and over 2.54 cm. The loading of total phosphorus at stie 10 is much greater per increment of rainfall for the larger storms. This seems to indicate a threshold level of runoff required to mobolize pollutants, after which increasing export (per unit of precipitation) is experienced. This same general relationship could also be observed for at least some parameters at sites 2 and 5. But the relationship was neither always clear cut, nor consistent among different parameters.

A different pattern was observed in the suburban catchment (site 7). Here, although the median loadings of TP were about the same during different sized storms, the highest values were found in conjunction with the smaller events (Figure 19). This might be a reflection of a first-flush effect sometimes seen in urban catchments. The bulk of the pollutant load may be carried by the first volumes of runoff. Therefore, if the total loads of smaller and larger storms were similar, the smaller storms would have a higher loading rate.

The above two examples serve to point out some of the inadequacies of median or mean loading values. The factors affecting these loading rates are many, and their interactions complex. Without a better understanding of these interactions, the best loading estimates obtainable probably remain statistics such as shown in Table V.

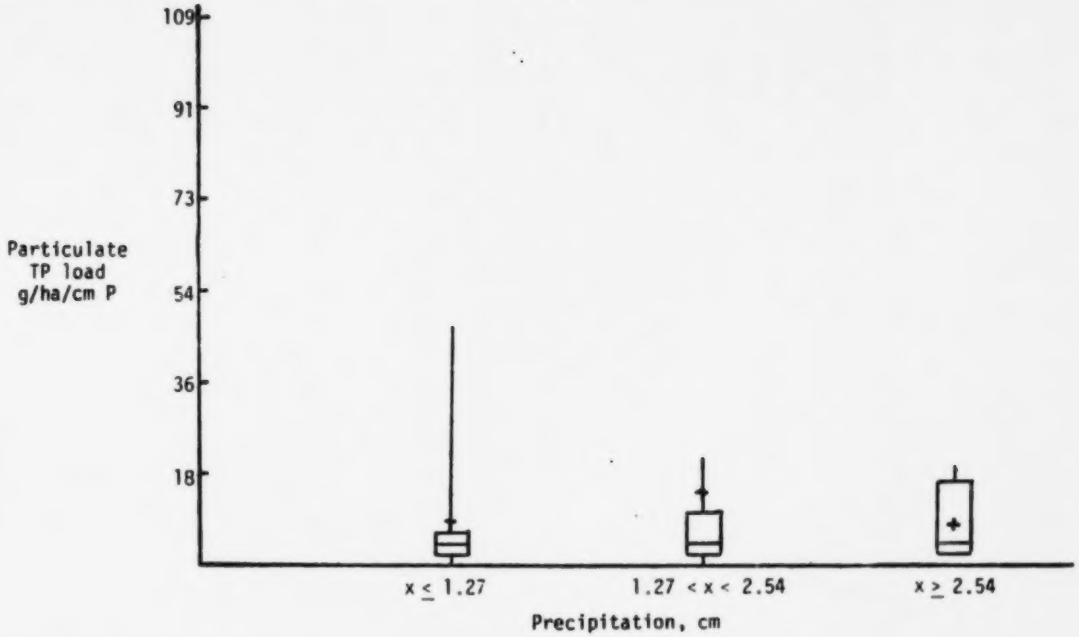

Figure 19. Variation of total particulate phosphorus loading with storm size at site 7.

Another means of site comparison which is sometimes utilized is pollutants loading in terms of kilograms per hectare per year. This, however, is a number not easily obtained, due to periods of missing information, which are present in every study. On occasion a flowmeter or sampler malfunctioned, or some difficulty in the laboratory precluded complete chemical analysis of the samples. The problem, then, is that of estimating the contribution of the missing storm data to the total pollutant load. This is a problem without a completely satisfactory answer. Because there is no single approach to obtaining these annual loadings, several methods will be suggested. Selection of a particular method may then be made with full awareness of its limitations.

Mean loadings in kilograms per hectare per centimeter of rainfall have already been listed in Table V. As a means of estimation, this value can be multiplied times annual rainfall to produce the desired loadings. The measured rainfall at the site may be utilized (Appendix B-1), or a mean annual rainfall for the area (approximately 102 cm) may be assumed. The result of this calculation will most likely be too large, because only rainfall events producing runoff were originially used to construct Table V. Smaller storms may produce no runoff at all. Moreover, mean values in these non-normal distributions might also tend to overestimate the loads.

A second approach to calculation annual loads parallels that outlined above. This alternative, however, would utilize the medians given in Table V. The median may be a better estimator for these populations than the mean. The rainfall could be measured or estimated, as mentioned above. This technique may underestimate the annual load, however, because the pollutant loading from one very large storm may represent a significant portion of the annual load at a given site. At the same time, in terms of water quality impacts the effect of a single large storm is probably not as significant as a series of smaller ones.

A third method which can be used to estimate annual pollutant loads involves comparison of the rainfall associated with monitored events with total measured rainfall. For example, perhaps storms resulting in a total rainfall of 25 cm were completely monitored, and produced a calculated load of 50 kg/ha. If it were also known that events associated with 4 cm of rainfall went unmonitored, then the total load could be estimated at 29/25 x 50, or 58 kg/ha.

All of these calculations inherently assume a linear dependence of runoff load to rainfall. Such a relationship is not, in fact, supported by data from individual events. Runoff, for example, is known to be affected by antecedent moisture conditions, and the runoff quality produced may differ greatly for different storms. If annual loadings are calculated, these limitations must be kept in mind.

As an indication of minimum values, the total kg/ha pollutant loading measured at each site over the study period have been compiled in Table VI. Reference to Table II will indicate that considerable differences exist in the number of events monitored at these sites. Moreover, not all chemical analyses were performed on all samples. Nevertheless, these results may prove of some value in a rough sense.

Miscellaneous Data

Some water quality data were collected on an irregular basis. These data included zinc and lead concentrations, biochemical and chemical oxygen demands measurements and pesticide analyses. These will be only briefly summarized here.

The metals data are contained in the data set in Appendix A. They are summarized in Table VII. Lead was detected only in the suburban catchment, and even then infrequently. Zinc appeared to be much more prevalent. The largest concentrations of total zinc were found at sites 1 and 2, which were located on the same farm. Zinc was most consistently detected at the suburban site however, being found in all sample analyzed.

Chemical oxygen demand (COD) data are summarized in Table VIII. Median values at all sites were nearly the same, except for the heavily grazed pasture (site 1), which was much higher. The forest site exhibited the lowest COD concentrations. The few biochemical oxygen deman (BOD) measurements made are contained in Appendix C. In general, the values measured were rather low. This may be due in part to constituents in the runoff (such as heavy metals or pesticides) which could exhibit bacterial growth. Concentrations of BOD_{20} were below 10 mg/L. Analysis of filtered and unfiltered samples indicated more than half of the BOD measured was soluble. Analysis of inhibited and uninhibited samples indicated carbonaceous BOD represented 70 - 90% of the total.

During the course of this study two sets of samples were collected specifically for analysis of pesticides and herbicides. The first samples were collected on August 13, 1979 and were analyzed at the Department of Biochemistry laboratory at VPI & SU, in Blacksburg, Virginia. The initial

Table VI. Total pollutant loads (kg/ha) measured during the study period. Monitored events were incomplete at most of the sites.

Site	TSS	NH_3-N	TKN	SKN	ox-N	TN	OP	TSP	TP
1	410	0.252	2.63	0.771	0.864	3.39	0.0668	0.176	0.787
2	316	0.185	2.72	0.981	3.53	6.26	0.209	0.197	0.824
5	22.9	0.041	0.382	0.212	0.0740	0.456	0.0186	0.0108	0.420
7	509	0.756	3.96	1.66	1.79	5.73	0.223	0.252	0.889
9	84.6	0.106	1.38	0.293	0.116	1.49	0.0231	0.351	0.407
10	96.0	0.0753	0.855	0.387	1.08	1.93	0.0735	0.0693	0.187

Table VII. Summary of zinc and lead concentrations found at study sites.

Site	No. of Samples	No. above Detection Limit[a]	Concentration, μg/L		No. above Detection Limit[b]	Concentration, μg/L	
			Maximum Soluble Zn	Maximum Total Zn		Maximum Soluble Pb	Maximum Total Pb
1	31	10	60	460	0	--	--
2	30	11	55	235	0	--	--
5	7	3	10	30	0	--	--
7	37	37	80	180	3	--	160
9	29	11	75	75	0	--	--
10	3	3	20	35	0	--	--

a detection limit 20 μg/L
b detection limit 100 μg/L

results were of some concern at that time because of the relatively high reported concentrations for polychlorinated biphenyls (PCB's).

A broader scan for pesticides and herbicides was carried out on samples collected on March 5, 1980. A sample from the Occoquan Reservoir, near the water treatment plant intakes, was included in this set of samples. PCB levels in these samples were noticeably lower. None of these samples were filtered, so that the variations observed in duplicate analyses might be due to differences in the suspended matter included in each individual sample. The results of the two sets of pesticide analyses are contained in Appendix D.

Table VIII. Chemical Oxygen Demand Measured in Runoff Samples

Site	No. Samples	Concentration, mg/L Median	Mean	Maximum
1	14	146	137	277
2	10	52	56	96
5	4	58	75	150
7	20	52	62	166
9	8	31	37	88
10	4	66	239	784

Best Management Practices

Several of the sites studied were selected in a manner to "pair" land management practices. This was done in an attempt to discern differences in pollutant loadings from otherwise similar catchments which were managed using different techniques. Two selected catchments drained cropland, and two drained pastureland. Other paired monitoring sites were established to investigate the effects of ponds on pollutant reduction. Management information for the different sites is recorded in Appendix F.

A confounding factor in comparison of sites such as these is that no two sites can be exactly identical in physical characteristics. Therefore, the existing differences in soil character and slopes, for example, will influence the results. These effects have been minimized to the extent possible by selection of paired sites without vastly differing physical characteristics. The selection criteria were used to isolate management practices as the principle differences between sites, insofar as possible. Nevertheless, the reader is cautioned that the differences observed are site differences, *in toto*. Inherent in the results are not only differences in management proactices, but also differences in the physical characteristics of the catchments, the precipitation record at the sites, and even the success rate of monitoring a given site. Given these caveats, comparisons of the paired study sites follow.

Pasturelands

Two pasture sites were investigated. One was categorized as heavily grazed (site 1), while the other was lightly grazed (site 5). One might anticipate more disturbance to the land, and less ground cover, in the heavily grazed catchment. And this might be expected to produce higher pollutant loadings. This was exactly what was observed.

Comparative data for these two sites have already been presented. Figures 5 - 12, along with Table III, indicate the generally large differences observed in pollutant concentrations. Particularly notable was the difference in TSS. The good ground cover at site 5, along with the shallower slopes there, apparently lowered the transport of solids from the catchment. The differences observed in soluble pollutants (e.g. ox-N, Figure 9) can be ascribed to the relative availability of the constituents at the two sites. The heavily grazed pasture would naturally accumulate more livestock excrement, which would be leached and carried off in runoff.

As discussed earlier, the skewed nature of the collected data distribution required the use of nonparametric statistical methods. The Wilcoxon rank sum test is one such method. The Wilcoxon sum rank test compares two sample populations to see if they are different. Ranks are assigned to the entire data set. If one population differs significantly from the other, it can be expected to have a greater number of either higher or lower ranks than the second population. The sum of its ranks can be tested to see if it is high enough, or low enough, to be considered different. For large samples, this rank sum is normally distributed. It can be compared to values in the standard normal table to determine how large it must be in order to be considered the result of two different populations

(Hollander and Wolfe, 1973).

The Wilcoxon rank sum test was used to compare pollutant concentrations at the two pasture sites. The results are recorded in Table IX. Statistically significant differences were found (at the 0.05 level of significance) in six parameters: TN, TSN, TKN, ox-N, TP and TSS. The differences in TN, TSN and ox-N concentrations were found to be most significant statistically. The least significant statistical differences were found in the concentrations SKN, NH_3-N, OP and COD.

An evaluation of the applicability of statistical tests to various data treatments was made by McTernan (1980). One of the principal assumptions in these tests is that the data were randomly collected from a single population. Whereas flow-weighted concentration units appeared to meet this requirement, McTernan concluded pollutant loadings related to precipitation did not. Therefore valid statistical tests of differences in pollutant loadings could not be made. Because of this finding no attempt will be made to statistically treat the loading data here. However, useful comparisons can be made by use of graphical techniques.

Differences in pollutant loadings at these sites have already been portrayed in Table V, and in Figures 13 - 17. The pollutants related to solids transport seem to show the greatest loading differences between the two pasture sites. An order of magnitude difference was observed in the median TSS loadings, for example (Figure 13). Large differences in ox-N loadings were also evident (Figure 16), but differences were less clear for other parameters.

Table IX. Results of Wilcoxon sum rank test for observed pollutant concentrations at pastureland sites.

	Mean Ranks		Significance
Parameter	Site 1	Site 5	Level
TN	24.96	7.36	0.0000*
TSN	24.27	6.55	0.0000*
TKN	23.36	11.45	0.0035*
SKN	20.50	15.45	0.2008
NH_3-N	23.00	19.42	0.4089
ox-N	27.87	6.83	0.0000*
OP	23.39	18.42	0.2498
TSP	20.82	13.33	0.0738
TP	21.71	10.56	0.0075*
TSS	25.83	10.67	0.0003*
COD	10.36	6.50	0.2220

*significant at 0.05 level or greater

The two pasture sites monitored were proximate to each other, so differences in precipitation between the two were deemed negligible. The hydraulic efficiency of the two catchments were also surprisingly similar. Hydraulic efficiency may be evaluated as the percentage of total rainfall occurring in a storm event which is measured as runoff from the catchment. The median value at site 1 was 5.0%; at site 5 the median was 5.1%. Both were, incidentally, among the lowest median efficiencies measured at any of the study sites. Because of the above similarities, the differences observed in the loadings may be attributed in large part to water quality differences in runoff from these two sites.

These two catchments underscore the variation which can be expected in pollutant loadings (and concentrations) within the same land use category. At times the pollutant transport from the heavily grazed pasture was the highest observed at any site, while the export from the lightly grazed land was simultaneously the lowest (e.g., TSS in Figure 13).

Croplands

Two catchments which were planted with corn were monitored throughout this study. At site 2 the farmer converted former pasture into cropland. With the use of herbicides, he established his crop using no-till techniques. However, after harvesting the first crop, he harrowed his field. Following this, the management practices used were better characterized as minimum till. Site 10 was in minimum till practice throughout the study. A record of tillage and fertilizer applications is contained in Appendix F.

Earlier discussions lumped site 2 data together from the standpoint of representing cropland in general. To differentiate management practices, however, the data must be divided into two groupings. Reference to site "2A" hereafter may be interpreted as site 2 under no-till management (May, 1979 - December, 1979), whereas reference to site "2B" relates to the same cornfield under minimum-till management (January, 1980 - May, 1981). Although the precipitation patterns were different during these two periods, about the same number of events were monitored: 11 at site 2A, and 8 at site 2B. Because basic physical site characteristics remained unchanged, an opportunity to relate differences in pollutant export directly to management practices was provided.

The Wilcoxon rank sum test was used to statistically evaluate the differences in pollutant concentrations coming from sites 2A and 2B (Table X). Significant differences were found in the following parameters: TN, TSN, ox-N, OP and TSP. It is interesting that the TN, TSN and ox-N concentrations were significantly smaller during the no-till management period, the OP and TSP concentrations were significantly larger. This

Table X. Results of Wilcoxon rank sum test for Site 2 under different management practices.

Parameter	Mean Rank 2A	2B	Significance Level
TN	7.00	13.43	0.0145*
TSN	6.35	12.79	0.0112*
TKN	8.55	11.00	0.3651
SKN	9.70	8.00	0.5259
NH_3-N	9.59	10.56	0.7412
ox-N	7.45	13.50	0.0232*
OP	13.45	5.25	0.0020*
TSP	11.60	5.29	0.0128*
TP	8.95	9.07	1.0000
TSS	8.55	12.00	0.2006
COD	5.00	6.25	0.5940

*significant at 0.05 level or greater

may relate to the quantity of fertilizer applied during the different periods, but is of uncertain meaning. It is notable, however, that the significant differences appear to be due to soluble nutrient fractions. Differences in TSS, and even TP, were not found to be significant.

The brief summary of data at these sites (in Table XI) indicates that concentrations at 2B were generally greater than at 2A and in fact agreed more closely with the concentrations observed at site 10. This is particularly apparent in the TSS data, which is also represented graphically in Figure 20. Note that although the range of TSS concentrations varies substantially, the median and mean values at site 2B and site 10 are relatively close.

Figure 21 illustrates the relationship among these sites for total nitrogen concentrations. The majority of the TN is composed of oxidized nitrogen forms. The concentrations were highest at site 2B. This may be caused by the increased amount of animal manure being applied compared to earlier periods (2A). Site 10 had a median TN value between the other sites, but a mean value well above them. This can be attributed to a single high ox-N value of 70 mg/L. If this one concentration is ignored, the mean ox-N concentration is reduced to 4.94 mg/L, and the TN concentration to about 9.5 mg/L. Both these values more closely approximate those calculated for site 2B.

Little change was apparent in total phosphorus concentrations between sites 2A and 2B (Figure 22). However, less soluble phosphorus was present in runoff from site 2B (Table XI). The agreement between site 2B and

Table XI. Summary of Pollutant Concentrations Observed at Cropland Sites, mg/L

Parameter	Median Values			Mean Values		
	Site 2A	Site 2B	Site 10	Site 2A	Site 2B	Site 10
TSS	70	183	168	211	382	361
NH_3-N	0.18	0.20	0.21	0.24	0.20	0.43
TKN	2.26	3.13	2.25	2.74	3.57	4.51
SKN	1.08	0.97	1.19	1.34	1.16	1.47
ox-N	2.22	4.53	3.40	2.38	5.94	8.77
TN	3.75	11.0	6.33	5.12	10.1	13.3
OP	0.17	0.02	0.18	0.239	0.048	0.165
TSP	0.285	0.07	0.2	0.294	0.0957	0.198
TP	0.495	0.45	0.59	0.769	0.797	1.28
COD	44.4	56.9	66	51.7	62.9	239

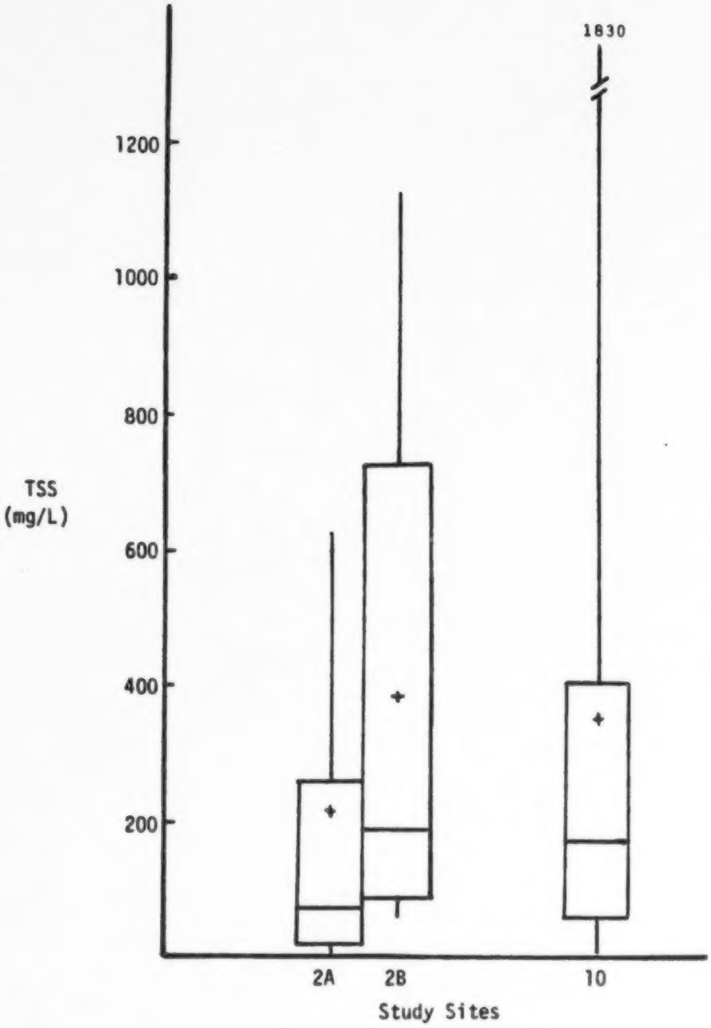

Figure 20. A comparison of total suspended solids concentrations observed at cropland sites.

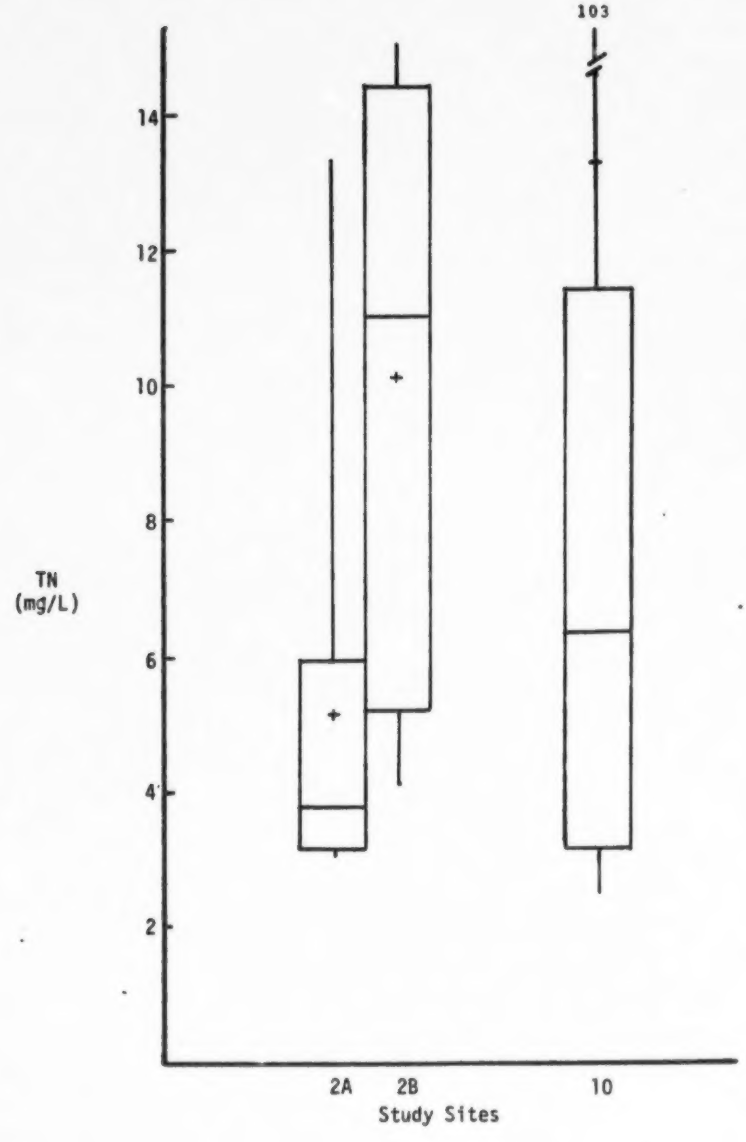

Figure 21. A comparison of total nitrogen concentrations observed at cropland sites.

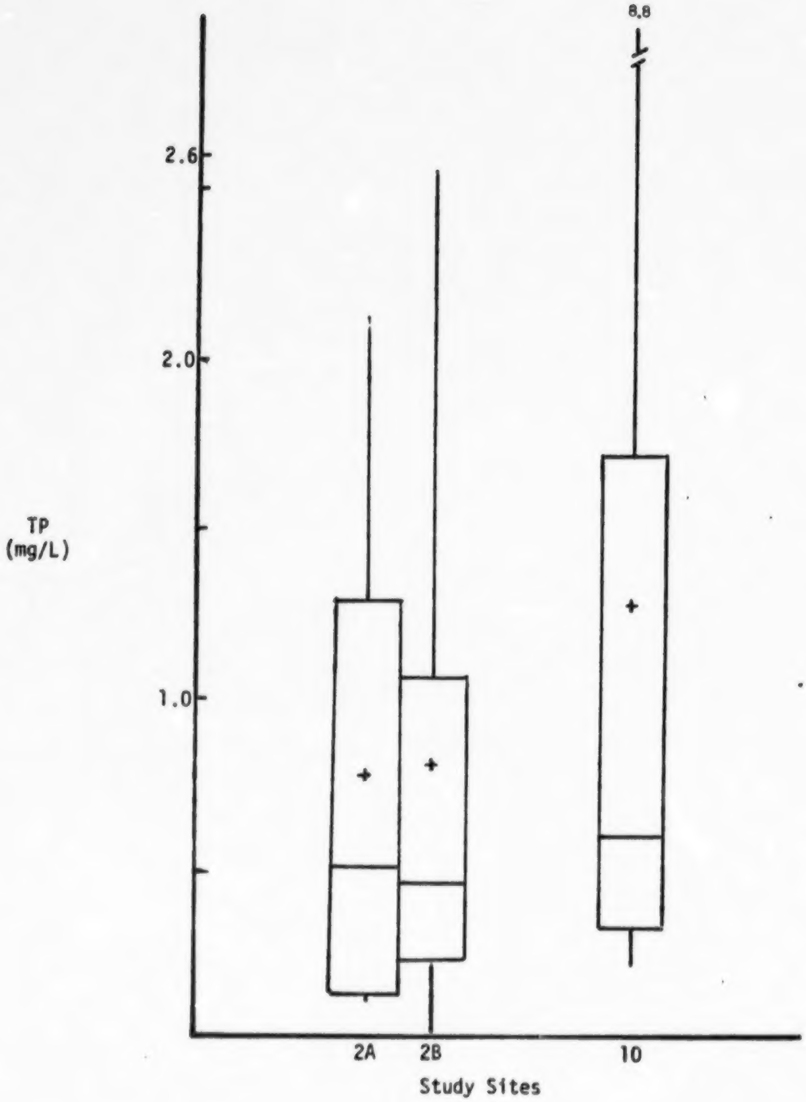

Figure 22. A comparison of total phosphorus concentration observed at cropland sites.

10 seen in other parameters is not apparent in the phosphorus data. Perhaps phosphorus concentrations are more site dependent than some of the other parameters.

The concentrations measured at the site 2A (no-till) were not significantly different from those measured at site 10 (Table XII). Nor were there many significant differences between site 2B and 10, which were both managed with minimum-till practices (Table XIII). However, in the latter instances OP and TSP were significantly different. This might relate to differences in fertilizer applications at the two sites.

A comparison of pollutant loading rates at site 2A and 2B is of particular interest because they represent different management practices on the same field. Table XIV indicates the loading rates calculated for site 2B were in general higher than those at site 2A. The higher loading rates under minimum-till management (compared with no-till) can in part be explained by the increases in measured pollutant concentrations. Moreover, the mean hydraulic efficiencies for the two periods also differed. For site 2A a mean hydraulic efficiency of 8.3% was calculated; at site 2B it was 13.4%. Thus, both increased concentrations and greater hydraulic efficiencies would be expected to contribute to the higher loading rates observed at site 2B.

The loading rates at site 10 were in general intermediate between those at sites 2A and 2B (Table XIV). That no significant differences could be found in concentrations at sites 2A and 10 suggests any actual differences in loading rates were due to other factors. The mean hydraulic efficiency at site 10 was 9.0%, which was between those calculated for sites 2A and 2B, although closer to the former. This would agree with the intermediate loading rates calculated for site 10.

TABLE XII. Results of Wilcoxon sum rank test for observed pollutant concentrations at different cropland sites.

Parameter	Mean Rank		Significance Level
	2A	10	
TN	13.00	15.47	0.4517
TSN	11.95	15.21	0.3153
TKN	13.18	15.35	0.5102
SKN	12.70	14.76	0.5303
NH_3-N	12.82	15.59	0.3971
ox-N	12.45	15.82	0.3007
OP	15.64	13.76	0.5724
TSP	13.20	11.08	0.4757
TP	12.05	13.63	0.6176
TSS	13.09	15.41	0.4804
COD	4.67	6.75	0.3374

TABLE XIII. Results of Wilcoxon sum rank test for observed pollutant concentrations at two minimum-till cropland sites.

	Mean Rank		
Parameter	2B	10	Significance Level
TN	15.43	11.29	0.2040
TSN	14.79	11.56	0.3249
TKN	14.43	11.71	0.4090
SKN	9.00	13.94	0.1274
NH_3-N	12.13	13.41	0.7049
ox-N	14.75	12.18	0.4316
OP	5.56	16.50	0.0006*
TSP	5.93	12.96	0.0126*
TP	10.57	11.93	0.6723
TSS	14.19	12.44	0.6001
COD	4.25	4.75	0.8852

* Significant at 0.05 level or greater

TABLE XIV. Summary of pollutant loadings observed at cropland sites, g/ha/cm P. Divide table values by 1000 to obtain units of kg/ha/cm P.

	median values			mean values		
Parameter	site 2A	site 2B	site 10	site 2A	site 2B	site 10
TSS	168	3620	472	3660	6220	2290
NH_3-N	0.228	0.922	1.33	2.67	1.39	1.90
TKN	4.68	28.6	12.0	34.7	47.7	21.2
SKN	4.15	5.30	7.37	16.8	13.0	10.7
ox-N	2.80	25.0	17.0	19.6	122	30.7
TN	7.50	101	37.5	54.3	187	52.1
OP	0.534	0.129	0.856	3.30	0.218	1.62
TSP	0.220	0.455	1.73	11.2	2.54	8.08
TP	0.357	7.55	2.99	10.9	12.3	5.34
COD	17.3	1210	299	1620	2390	3730

Detention Ponds

Site 4 was established below the farm pond to take advantage of site 2, which was already in place, and because the two stations provided an opportunity to evaluate pollutant removals effected by the pond.

After monitoring for a limited period, estimates of pond trap efficients were made (McTernan, 1980; Weand, 1981). These estimates indicated 93 percent of the suspended solids were removed from runoff moving through the pond, along with 87-95 percent of the suspended nutrient load. Even the soluble nutrient load appeared to decrease in the range of 86-93 percent.

Reduction of pollutant loading by adsorption, sedimentation and algal uptake were all potential mechanisms to explain the observations. However, there was also concern that the storage capacity in the pond was not considered using a simple inflow-outflow mass balance approach. If the pond had been lowered through evaporation, infiltration and seepage prior to a storm event, the increased storage capacity would obviously reduce the over flow received at the outlet station. This would in turn increase apparent trap efficiencies.

Because of concern for the undefined influence of pond storage volume, a survey of the pond was conducted during the summer of 1980. Continuously a staff gage was set in place in the pond. The depth profile resulting from the survey is shown in Figure 23. Maximum storage in the pond was calculated to be 6030 m^3. The maximum depth of the pond was 2.4 m, and the mean depth was only 0.91 m.

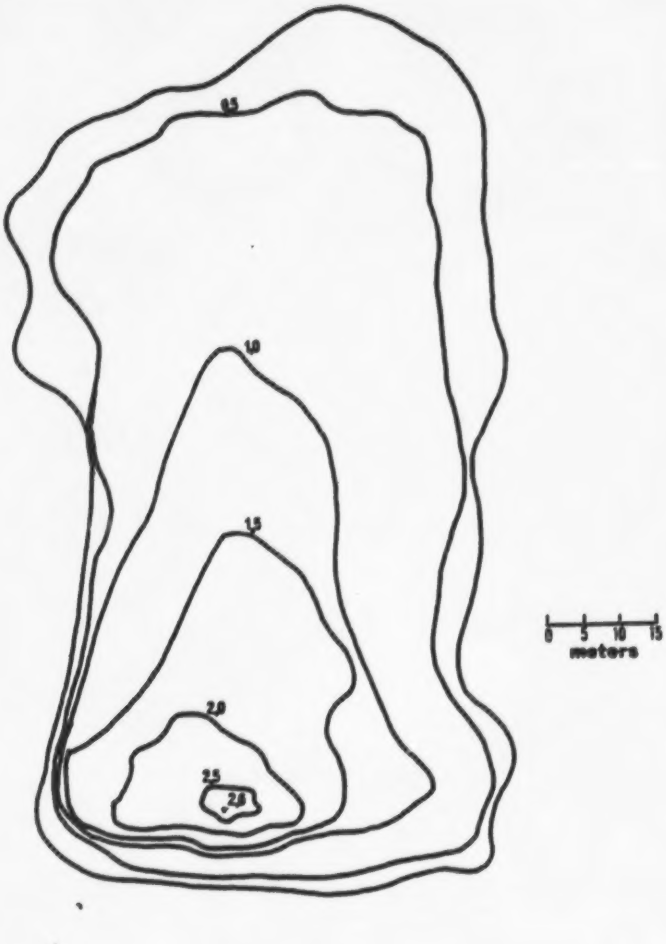
0.5
1.0
1.5
2.0
2.5
2.8
0 5 10 15
meters

Figure 23. Bathymetric survey of farm pond upstream of site 4. Depths are given in meters.

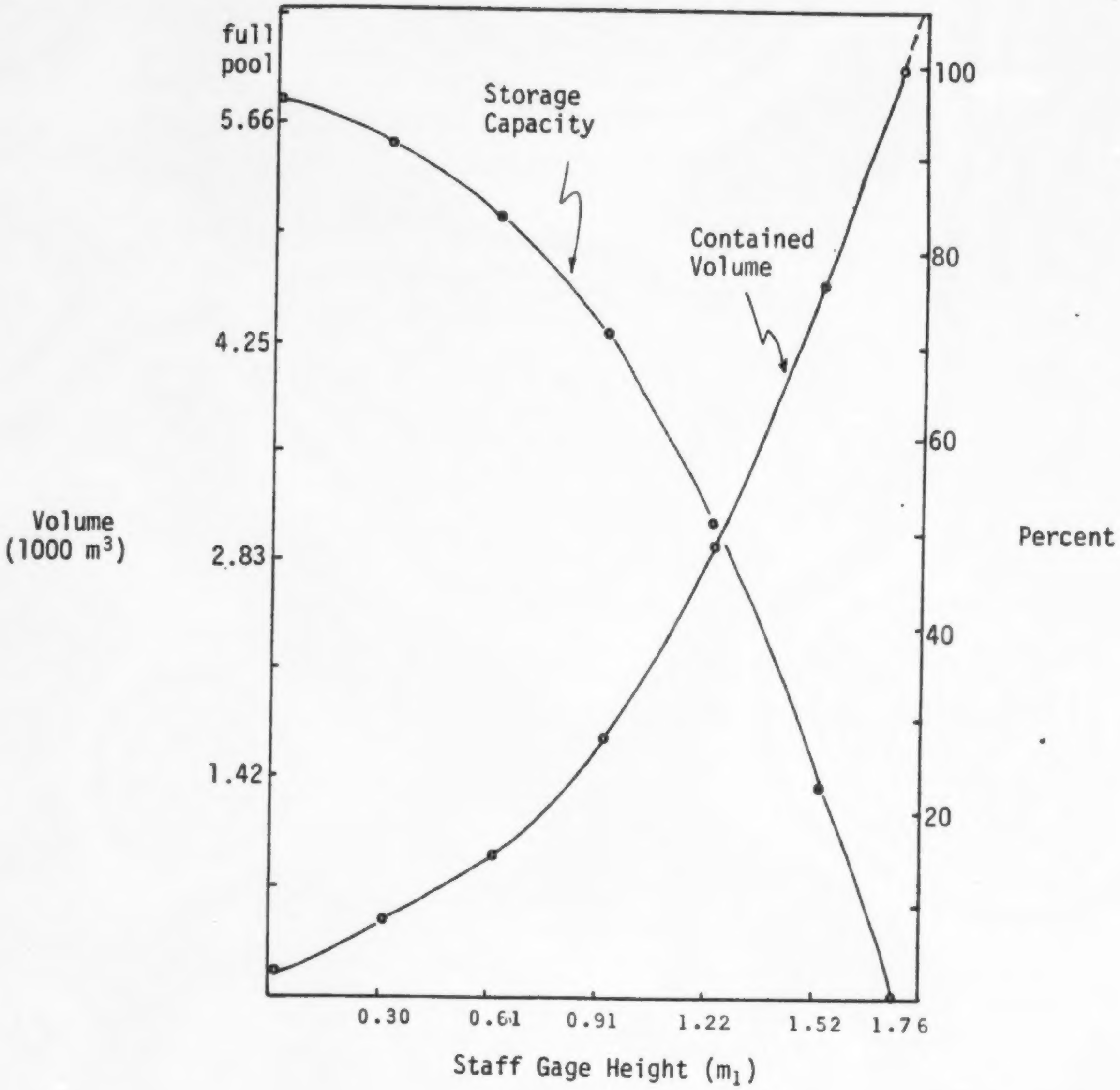

Figure 24. Relationship of farm pond volume to height of installed staff gage.

Unfortunately, after developing the relationships indicated in Figure 24, the drought of 1980 continued. The duration and extend of the drought was such that no runoff from the pond was observed for the duration of the monitoring period (Table II). Therefore, it was not possible to calculate trap efficiencies which could exclude the effects of storage capacity.

An alternative view of pollutant reductions effected by the pond can be had by looking at the change in pollutant concentrations measured at CB-2 and CB-4. Table XV summarizes such changes for a storm monitored in September, 1979. This particular storm was chosen because it was known the pond was full due to previous rainfall.

The calculations based upon this particular storm indicate that the pond acted as an efficient sediment trap (85% concentration reduction). A large reduction in total phosphorus concentration (86%) was also observed, which was apparently due not only to the settling of suspended matter (91% reduction in concentration of particulate phosphorus), but also to a substantial reduction of soluble phosphorus concentration (66%). The latter could be explained by adsorption on pond sediments. In fact, a study by Kelley (1981) indicated the adsorption maxima for surficial sediments in the pond ranged from 2.23 - 2.97 mg P/g.

The reduction in total nitrogen concentration was far less than those noted for suspended solids and phosphorus. The 34% reduction noted was largely due to the 61% reduction in oxidized nitrogen concentration. The immediate cause of this reduction in oxidized nitrogen is not entirely clean, but algal uptake is a possibility. Thick algal mats were observed in the pond throughout the summer of 1979.

Table XV. Pollutant concentration reductions in passage through farm pond. Storm number 248: September 5, 1979.

Parameter	Concentrations, mg/L Site 2	Site 4	% decrease
TSS	290	45	85
TP	2.13	0.29	86
TSP	0.38	0.13	66
OP	0.30	0.08	73
TKN	2.92	2.31	21
SKN	1.04	1.41	-36
NH_3-N	0.30	0.62	-107
ox-N	1.44	0.56	61
TN	4.36	2.87	34
PN[a]	1.88	0.90	52
PTP[b]	1.75	0.16	91

[a] Particulate N = TKN-SKN

[b] Particulate TP = TP-TSP

Of some interest are the increase in SKN and NH_3-N noted in Table XV. This may relate to degradation of the TKN originally delivered to the pond. Dentrification processes might also be actively occurring in anaerobic regions of the pond which could account for the observed reduction in oxidized nitrogen levels.

The distributions of both nitrogen and phosphorus species were altered during passage through the pond. The particulate fraction of nitrogen changed from 43% to 31%, and the fraction of particulate phosphorus went from 82% to 55%. In addition, the composition of suspended solids changed from 0.65% to 0.36% phosphorus. The solids emanating from the pond therefore were enriched in nitrogen, and depleted in phosphorus, when compared to the solids entering the pond. Some of these changes may be related to the wading of animals in the pond, since their wastes would add to the nutrient loading found there.

Site 7 was established to characterize runoff from a suburban development, and to provide influent data related to the downstream detention pond. Site 8 was paired with site 7 in order to monitor the outfall from the pond. From the outset difficulties were encountered at these stations, and particularly at site 8.

The original plan for flow measurement at these stations was to rate the respective pipes. Two equations were eventually developed:

Site 7: $Q = 11.7\ (A)(R)^{2/3}$

Site 8: $Q = 17.1\ (A)(R)^{2/3}$

The variables in the above equations are defined as follows:

Q = discharge, cfs

A = cross-sectional area = $\frac{(\theta - \sin \theta) r^2}{2}$

θ = subtended angle in pipe = $2 \arccos \left(1 - \frac{D}{r}\right)$

D = diameter of pipe, ft (site 7 = 5 ft; site 8 = 2.5 ft)

The maximum valid depth (r) for site 7 is 2.5'; the maximum to be used at site 8 is 1.25'. In the latter case, the best agreement was seen in the range of 0.5 - 0.7 feet of stage.

Although the equation developed for flow calculations at site 7 seemed to be fairly reliable, the rating at site 8 was never really satisfactory. Meachanical problems compounded the frustration at the latter site, and a 76.2 cm (2.5 ft.) H-flume was finally installed at this location on April 14, 1980 to effect a solution. A 91.4 cm (3 ft.) H-flume was subsequently installed at site 7, on September 15, 1980.

One area of interest in respect to this detection pond was the effect it had in reducing pollutant loads. Twenty seven "paired" storms, i.e., those which were completely monitored at both upstream and downstream locations, were available for analysis. The loads calculated from the available flow and chemical data, however, were confusing. Often it appeared that the load exiting the pond was greater than that entering.

Upon further investigation it appeared the discrepancy in the calculated loads was due in large part to flow factors. A comparison of the total inflows and outflows for the paired storms revealed wide variations. Six of the storms resulted in less than a 0.5 ratio between the total flow at site 8 compared to site 7. Eleven of the storms showed a ratio greater two. No simple explanation seems satisfactory for these results, but several suggestions can be made.

The drainage area upstream of site 8 is substantially larger than that upstream of site 7 (Table I). On a linear basis the delivery of pollutants to the pond might be 29 percent greater than that measured at site 7 alone. Mean hydraulic efficiencies of both sites were high: about 20% for site 7 and 30% for site 8. The higher value at site 8 might relate to the steeper slopes nearer to this site, and could account in part for the disproportionate loading.

Errors in flow measurement at each of the stations must also be considered. Naturally, comparisons of the stations would compound these errors. The subject of error in the measurements has been discussed earlier. These errors would pertain not only to stage measurements, but to timing factors as well.

Differences in water quality also play a role in the loading differences. It is possible, for example, the quality of unmeasured inflow to the pond was quite different from that measured at site 7. Moreover, the pond was not well-maintained during the early monitoring period; deposits of trash and debris were much in evidence. Scouring of the pond could therefore actually result in higher pollutant loads being carried out of the pond than entered it.

Whatever the true causes, calculations of percent removals based upon load estimates do not yield consistent results. Suspended solids removals of 1-72 percent were found, but increases as high as 500 percent were also calculated. These different removal efficiencies did not appear to be related to precipitation or total flow. Although some storms yielded what appeared to be reasonable water balances and percent removals, it is impossible to justify using those results as the representative values. Because of this problem of identifying representative data, none will be reported here.

A look at the composition of solids at each location shows them to be different. The mean solids composition at site 7 was 0.82 percent nitrogen and 0.20 percent phosphorus. At the outfall to the pond the composition was found to be 0.54 percent nitrogen and 0.15 percent phosphorus. Thus the solids discharged from the pond contained less nutrients. This could be explained by several mechanisms:

1. transformation of nutrients to soluble forms in the pond;
2. removal of certain solids fractions to change the composition of the outflow; or
3. influx from other sources of a different quality of solid material.

October 1980, was a particularly important reference point at these sites because the pond was cleaned at that time. It is of interest, then, to compare the operation of the pond before and after that date. Because of the problems encountered with load calculations, it was decided to consider change in the concentrations of pollutants as they moved through the pond. This minimizes the effects of flow that would be reflected in total loads, although composite samples were, of course, prepared using the flow data.

Table XVI compares the pollutant concentrations measured at the two sites which were measured prior to the pond clean-out. No statistical differences were apparent at the 0.05 alpha level. The most significant differences were in TSP (0.2857 alpha). After the maintenance activity, there were still no statistical differences at the 0.05 level (Table XVII). However, many of the parameters were different in the alpha range of 0.10 - 0.20. This suggests more significant differences were present after the maintenance was performed.

It is also instructive to compare the nutrient concentrations of the suspended solids in pond influent and effluent. Before the maintenance activity no significant difference was found in the nutrient composition of the solids (Table XVIII). After maintenance highly significant differences were apparent. This suggests the operation of the pond was different after October, 1980, which resulted in either changes in the solids themselves, or in the particular fraction of solids discharged and retained by the pond.

Although the data collected do not provide a straight-forward representatiion of pond efficiency, the implication of the above considerations is that the pond was more efficient after clean-out.

Table XVI. Results of Wilcoxon sum rank test for observed pollutant concentrations observed in influent and effluent to the stormwater pond (prior to October, 1980)

Pollutant	Mean Rank site 7	 site 8A	Significance Level
TN	14.50	12.64	0.5542
TSN	14.86	14.14	0.8362
TKN	14.46	12.68	0.5715
SKN	15.86	13.14	0.3953
NH_3-N	15.21	13.79	0.6625
ox-N	14.89	14.11	0.8183
OP	14.04	13.96	1.0000
TSP	15.61	12.27	0.2857
TP	15.82	13.18	0.4082
TSS	14.65	13.39	0.6979
COD	4.00	4.80	0.7656

Table XVII. Results of Wilcoxon sum rank test for observed pollutant concentrations observed in influent and effluent to the stormwater pond (October, 1980 and after)

Pollutant	Mean Rank		Significance Level
	site 7	site 8B	
TN	15.69	11.31	0.1510
TSN	15.81	11.19	0.1303
TKN	15.50	11.50	0.1910
SKN	15.69	11.31	0.1510
NH_3-N	14.77	12.23	0.4119
ox-N	15.23	11.77	0.2592
OP	13.54	13.46	1.0000
TSP	14.38	10.27	0.1644
TP	15.12	11.88	0.2931
TSS	12.42	13.54	0.7237
COD	6.20	4.80	0.5309

Table XVIII Results of Wilcoxon sum rank test for percent nutrients in stormwater pond influent and effluent solids.

Time	Nutrient (totals)	Mean Rank site 7	Mean Rank site 8	Significance Level
Before October 1980	N	15.18	11.29	0.1983
	P	13.96	13.04	0.7779
October 1980 and after	N	16.25	10.00	0.0362*
	P	15.75	7.91	0.0062*

* significant at 0.05 level or greater

Atmospheric Inputs

Wetfall and dryfall precipitation were collected separately by means of an automated device described earlier. The chemical data for wetfall were reported in concentration units (mg/L). The dryfall data were reported in loading units of mg/m^2, based upon the cross-sectional area of the collection buckets. All these data are contained in Appendices B-2 and B-3.

For purposes of comparisons, both data sets were converted to loading rates of kilograms per hectare on an annual basis. Summation of the dryfall loadings in mg/m^2 allows direct conversion to units of kg/ha, which can then be annualized. Calculating a loading rate for wetfall requires an estimate of annual precipitation. For this, the 97.9 cm measured at the collection site (during the entire wetfall/dryfall collection period) was used as a basis. This resulted in an estimated annual precipitation of 70.9 cm, which was used in the calculations. Note that this value is below average yearly precipitation levels for the area.

Table XIX lists the results of these calculations. With the exception of solids and phosphorus, the wetfall contributions appear to be greater than those from dryfall. One would anticipate this to be even more the case in a year of normal precipitation, because the atmosphere would be washed out more frequently.

More solids were deposited via dryfall, about 60 percent of the annual total of 96.4 kg/ha. Nitrogen represented about 1.5 percent of the wetfall solids, and about 2 percent of those in the dryfall. This may be accounted for in large degree by the oxidized portion of the nitrogen load in the wet-

Table XIX Annual pollutant loadings from precipitation and dryfall (kg/ha/year)

Parameter	Annual loading from Precipitation	Dryfall	Total
TSS	35.5	60.6	96.1
NH_3-N	3.03	1.58	4.61
TKN	5.41	3.73	9.14
SKN	4.89	2.59	7.48
ox-N	5.62	2.06	7.68
OP	0.0778	0.198	0.276
TSP	0.220	0.228	0.448
TP	0.287	0.364	0.651
TZN	0.383	0.176	0.559
SZN	0.332	0.122	0.454
TPB	0.0452	0.00	0.0452
SPB	0.00	0.00	0.00
TOC	39.7	9.23	48.9
SOC	27.5	5.69	33.2
COD	98.1	76.2	174

fall. Nitrate compounds are very soluble, and a much greater load of nitrates is contributed by precipitation. Oxidized forms represented a greater percentage of the wetfall nitrogen (51%) than was observed in the dryfall (36%).

The phosphorus content of particulate matter, at least as discernable from Table XIX, is nearly the same in both wetfall and dryfall - about 2 percent, but more of the phosphorus in precipitation is soluble (77%) when compared to dryfall (62%). Still, both indicate relatively large quantities of soluble phosphorus are available from the atmosphere.

Over 1/2 kg/ha of zinc is deposited from the atmosphere in the course of a year, according to Table XIX, and over 80% of this is in a soluble form. One source of zinc commonly quoted is that of automobile tires. This would seem a more likely prospect in an urban area, however. The source at this agricultural location is not immediately evident. Lead was only detected in one sample. That single concentration of 395 $\mu g/m^2$ in wetfall influenced the mean value to a great extent, and probably resulted in too high a loading estimate.

An interesting comparison can be made between atmospheric loadings and the pollutant loads washed from the various catchments. The rough estimates of the latter (Table VI), although incomplete, can provide the basis for comparison with Table XIX.

Surprisingly, the solids contribution of the atmosphere was greater than the solids export in three of the catchments studied (sites 5, 9 and 10). This suggests a buildup of atmospheric solids within these catchments is possible.

The nutrient forms present a different picture. The annual nitrogen input from the atmosphere (16.8 kg/ha) is greater than the export observed at any site. Utilization by vegetation might provide an explanation for this. But relative phosphorus loadings are mixed - sometimes the export loads are higher than atmospheric inputs, and sometimes lower.

Since much concern in recent years has been expressed about "acid" rain, the pH of wetfall samples was routinely measured. The measurements were carried out in the laboratory after sample collection. This may have allowed some changes to occur, but no natural reactions would act to reduce the pH further from the original value.

As a measure of acidity, pH is defined as the negative logarithm of hydrogen ion activity. The pH of rainwater can be as low as 5.6 due to absorption of carbon dioxide from the air (Likens, 1976). Below this value so-called mineral acidity is present. This mineral acidity is generally considered to be caused by sulfate and nitrogen oxides in the atmosphere, which essentially form dilute solutions of sulfuric and nitric acids.

The range of pH values recorded during this study was from 3.2 - 6.1. The median value was 3.8. Only six of the 51 measurements indicated a pH above 4.5. The rainfall in the collection region can therefore be definitely classified as acid rain. The mode of the pH distribution was 3.8.

Rough calculations indicate insufficient oxidized nitrogen concentrations were present in the wetfall samples to account for rain acidity. Although analysis for sulfate was not performed in any samples, it would have to be the primary suspect as a causative agent of the acid conditions observed.

Large Sub-basin Monitoring

All the sites investigated in this study were situated in the Occoquan Watershed. An ongoing program of stormwater quality studies is conducted in the watershed as a part of the Occoquan Watershed Monitoring Program. Included in the network operated by that organization are sampling stations located on the major streams tributary to the Occoquan Reservoir. The locations of the stations are shown in Figure 25 and a description of each is given in Table XX. Each station is equipped with flow recording and water sampling gear and is operated in a manner similar to that described for the small watersheds discussed earlier. Stormwater and base flow samples were collected at these stations throughout the period of the present study. The stormwater data are reproduced as Appendix H. It should be noted that a far more extensive data base exists, but that space constraints preclude its reproduction in this document.

The major tributaries to the Occoquan Reservoir are Bull Run and Occoquan Creek. The stations located on these two tributaries, 51ST40 and 51ST10, respectively, are located immediately upstream of the tailwaters of the reservoir. During the period of this investigation (5/79 - 5/81), 42 storms were monitored at the Bull Run station, and 30 at the Occoquan Creek station. A statistical summary of constituent concentrations measured at these stations during runoff events is shown in Table XXI. The median TSS concentration was greater in Occoquan Creek than in Bull Run. However, the median total nitrogen concentration was greater in Bull Run. The major component of the nitrogen detected in the Bull Run runoff was oxidized. This is doubtless influenced, at least in part, by the consistant discharge of waters from

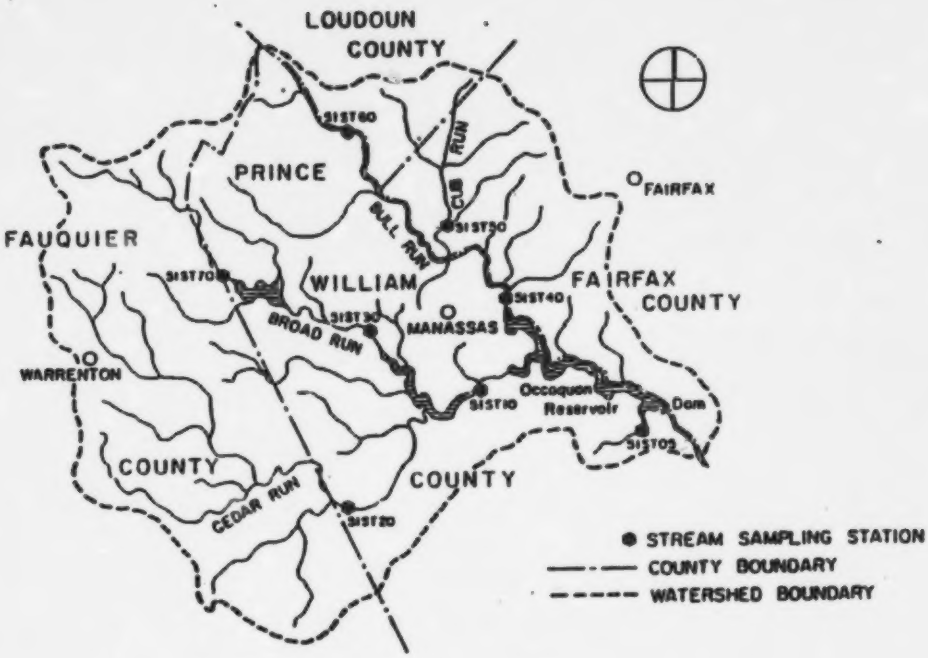
LOUDOUN COUNTY
31ST60
PRINCE
CUB RUN
FAIRFAX
BULL RUN
31ST50
FAUQUIER
31ST70
WILLIAM
FAIRFAX COUNTY
31ST40
31ST30
BROAD RUN
MANASSAS
WARRENTON
31ST10
Occoquan Reservoir
Dam
31ST02
COUNTY
CEDAR RUN
COUNTY
31ST20
● STREAM SAMPLING STATION
COUNTY BOUNDARY
WATERSHED BOUNDARY

Figure 25. Location of monitoring stations in Occoquan Watershed used to measure reservoir inputs.

Table XX. Physical Data for OWMP Runoff Monitoring Stations

Station Name	Station Number	Drainage Area ha	Predominant Land Use
Hooes Run	ST05	1,036	Suburban
Bull Run near Clifton	ST40	47,935	Mixed: Urban-Rural
Cub Run near Manassas	ST50	12,930	Suburban
Bull Run at Catharpin	ST60	6,685	Agriculture-Forest
Occoquan Creek near Manassas	ST10	88,874	Agriculture-Forest
Cedar Run near Aden	ST20	40,162	Agriculture
Broad Run at Linton Hall	ST30	23,216	Agriculture
Broad Run near Buckland	ST70	13,085	Agriculture-Forest

Table XXI Pollutant concentrations entering the
Occoquan Reservoir (May, 1979-May, 1981).
First, second and third quartiles are given.

		Concentrations, mg/L					
Sub basin	Parameter	Minimum	Q_1	Q_2	Q_3	Maximum	Mean
Occoquan Creek	TSS	1	17	69	251	2800	345
	NH_3-N	0.06	0.12	0.17	0.24	0.72	0.19
	TKN	0.45	0.95	1.24	1.67	4.67	1.50
	SKN	0.34	0.54	0.66	0.88	1.28	0.71
	ox-N	0.01	0.28	0.50	0.65	3.52	0.69
	TN	0.49	1.31	1.79	2.68	5.18	2.21
	OP	0.01	0.02	0.04	0.06	0.18	0.05
	TSP	0.03	0.04	0.06	0.088	0.22	0.07
	TP	0.04	0.06	0.08	0.16	0.21	0.10
	COD	12	28	37	45	110	40
Bull Run	TSS	4	15	25	106	244	61
	NH_3-N	0.04	0.13	0.15	0.20	0.34	0.16
	TKN	0.51	0.68	0.84	1.21	1.76	0.94
	SKN	0.36	0.55	0.66	0.78	1.20	0.69
	ox-N	0.38	0.70	1.14	2.53	10.58	1.84
	TN	1.22	1.77	2.17	3.35	11.32	2.79
	OP	0.00	0.02	0.03	0.04	0.09	0.03
	TSP	0.00	0.04	0.05	0.07	0.09	0.05
	TP	0.02	0.06	0.08	0.16	0.21	0.10
	COD	12	20	24	32	52	27

the Upper Occoquan Sewage Authority polishing reservoir with ox-N concentrations approaching 18 mg/L. In the Occoquan Creek runoff the median values showed the major nitrogen component to be TKN.

There was no observed difference in total phosphorus between the two stations. At first examination, this might appear to suggest a change in the relative areal relationship of phosphorus yield between the two major sub-basins from that reported by Randall, et al. (1977a and 1977b). It should be noted, however, that the data presented in Table XXI do not necessarily represent synoptic storms, and that missing values for large large or small storms at either basin could alter the median values considerably. Also, the data were taken during a two year period experiencing sub-normal rainfall.

For comparison to the small watershed areas investigated during this study, Table IV is useful. The median concentrations of TSS at both Bull Run and Occoquan Creek sub-basins are comparable to those observed at sites 5 and 9 (41 mg/L at the lightly grazed pasture and 52 mg/L at the forest site). These sites actually registered the lowest median TSS concentrations observed in the small watersheds; median concentrations ranging up to 502 mg/L were observed. This suggests the concentrations of sediment reaching the reservoir were considerably less than those leaving the smaller drainage areas. In the case of the Occoquan Creek station, it must also be noted a large impoundment is located directly upstream.

The median TN concentrations measured at sites 5 and 7 (1.77 mg/L at the lightly grazed pasture and 1.90 mg/L in the suburban area) are the most similar to those observed at the two stream stations. All other small watersheds exhibited higher median concentrations of TN, up to 6.33 mg/L at the minimum till cropland (site 10).

Interestingly, all the smaller watersheds exported greater (median) concentrations of total phosphorus than appeared at the stream station. The lowest median concentration observed in the small watersheds was 0.12 mg/L at the forested site (site 9). This suggests deposition or other removal mechanisms at work for this nutrient. The well-known association of phosphorus with particulate matter suggests one means by which the nutrient may be, at least temporarily, forestalled in its transport to the downstream area.

Of course, one factor not considered in the above discussion is that of flows. The stream flows are considerably larger than those in the small watersheds. The median stormflow rates in Occoquan Creek and Bull Run during this period were 19.7 m^3/sec and 11.9 m^3/sec respectively. The mean and maximum flows for Occoquan Creek were recorded at 30.3 m^3/sec and 149 m^3/sec; for Bull Run they were 15.2 and 75.9 m^3/sec, respectively. Thus, the flow rates in Occoquan Creek were about double those in Bull Run.

In order to compare actual loads delivered at the stream sites and from the small watershed, calculations were performed for each storm to determine transport in terms of mass per unit area (kg/ha). The results of these calculations for TSS, TN and TP were compiled using the box plot technique (Figures 26-28).

It is interesting that the median TSS areal stream loading for the agricultural sub-basin (Occoquan Creek) are very similar to that observed at the heavily grazed pasture (site 1), whereas the median loadings measured at the Bull Run station, which drains urban and suburban areas, is similar to the loadings at site 7 (the suburban catchment). The latter is also similar to the forested and minimum till catchments in this regard.

In terms of areal loadings, the Occoquan Creek shows the highest mean value (2.0 kg/ha), although individual values were higher at site 2. Since the TSS concentrations at the stream stations were generally lower than at the small catchment sites, the increased loads may be ascribed to the larger flows attendent to the stream stations. It also appears from Figure 26 that the median and mean areal loadings of TSS from the agricultural sub-basin were greater than those from the urban suburban area: 2.0 and 27.5 kg/ha vs 1.0 and 5.4 kg/ha.

The median areal loadings of TN are greater at the stream stations than at the small catchment sites (Figure 27). Among the catchment sites the croplands appeared to contribute the greatest loadings of TN on an areal basis, although the heavily grazed pasture site also showed high values. These increased loadings may again be related to flow, since TN concentrations are in general less in the streams than at the small sites. Contributions of groundwater to the streamflow may have an important impact here. The median and mean observed loadings respectively, were 0.052 and 0.16 kg/ha in Occoquan Creek, and 0.081 and 0.11 kg/ha in Bull Run.

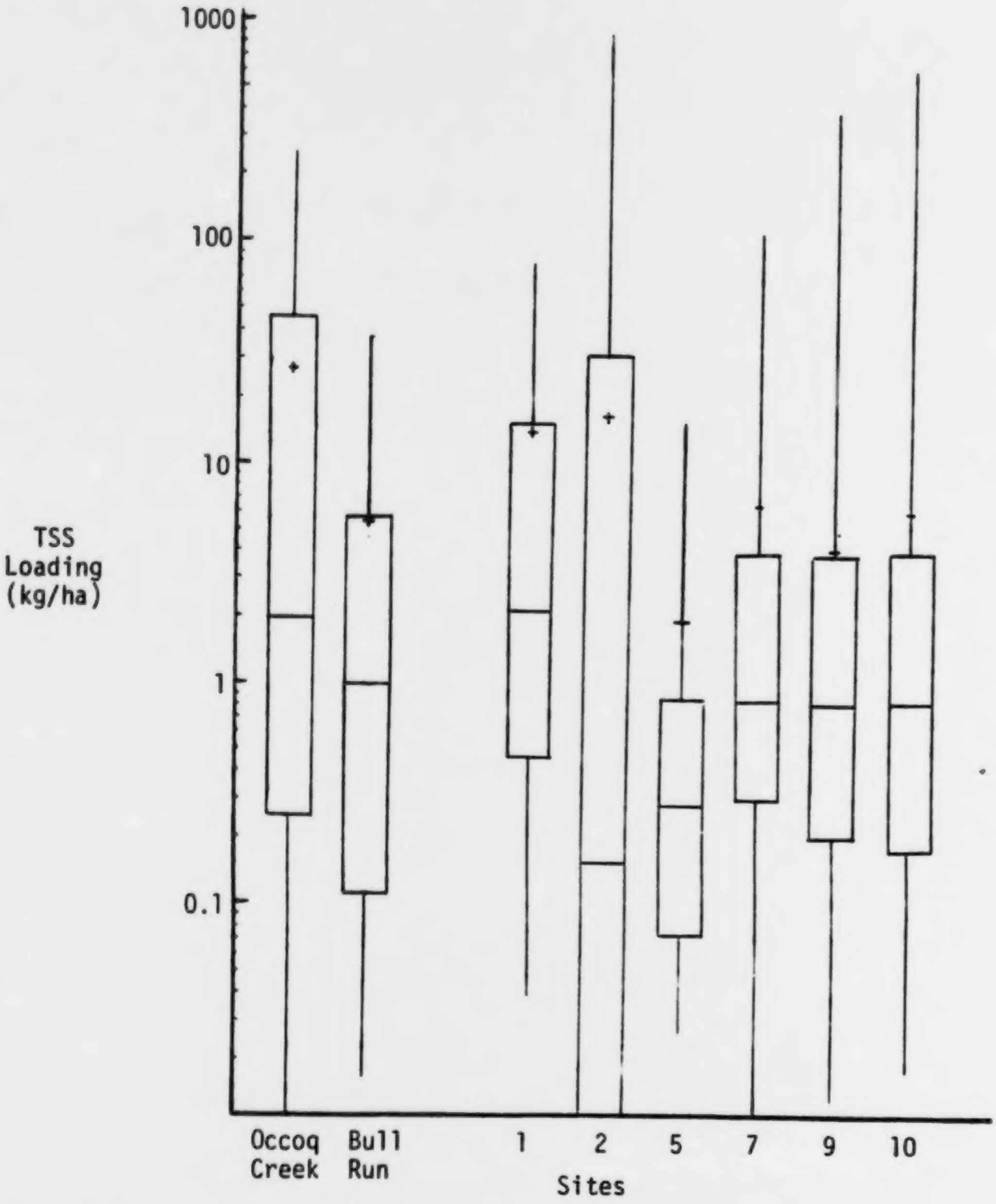

Figure 26. Areal loading of total suspended solids at two stream stations and at study sites.

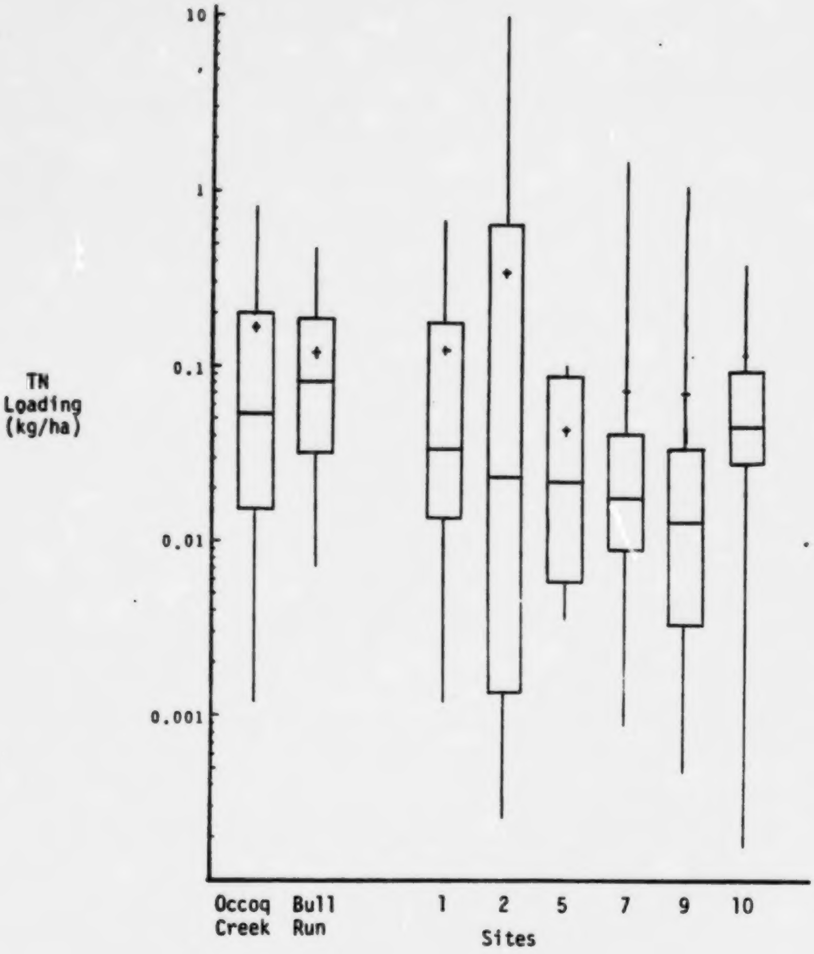

Figure 27. Areal loading of total nitrogen at two stream stations and at study sites.

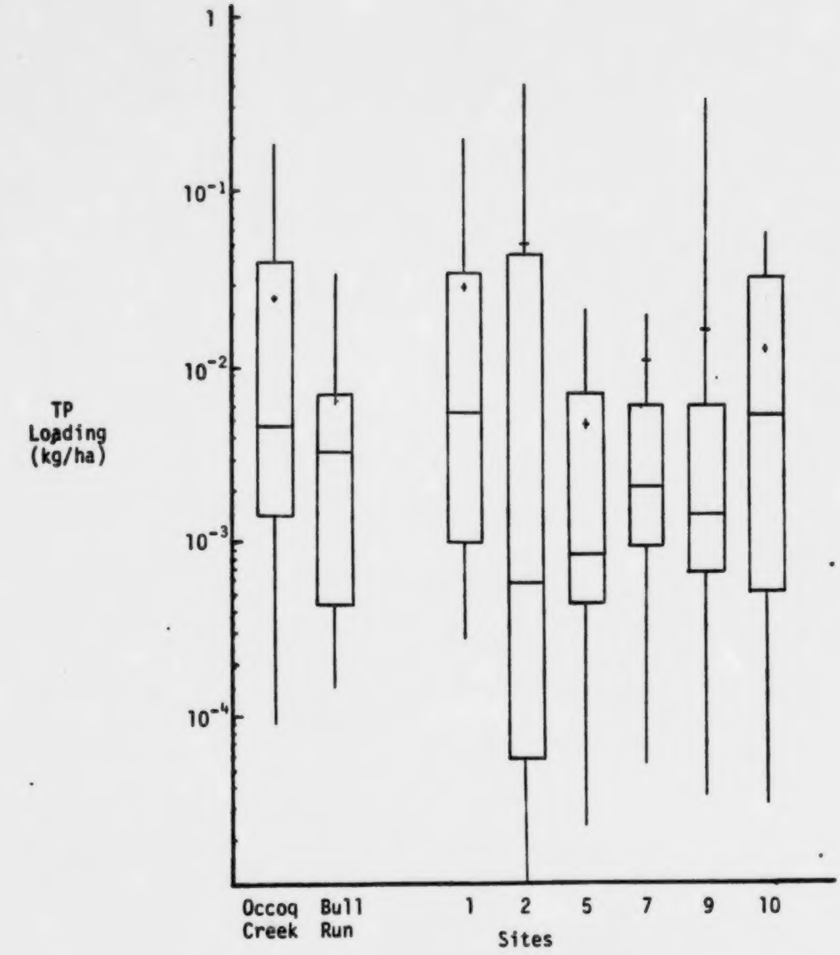

Figure 28. Areal loading of total phosphorus at two stream stations and at study sites.

While the median areal TP loadings at the stream stations were higher than observed in most of the small catchments, the mean values, particularly in Bull Run, were lower than in the catchments. This suggests a very few storms in the smaller catchments resulted in relatively high areal loadings of TP. On an areal loading basis, a few storms probably produce most of the annual load of TP in these catchments.

The median areal loadings of TP are of the same magnitude at the two stream stations: 0.0045 kg/ha in Occoquan Creek and 0.0033 kg/ha in Bull Run. However, the mean values are quite different: 0.024 kg/ha in Occoquan Creek and 0.0064 kg/ha in Bull Run.

The results from these two stream stations have indicated there is no straight-forward, simple relationship between pollutant export from small watersheds and the transport of these materials downstream. Obviously there are many complex processes at work. The data collected at small watershed sites in this study, along with the long-term collection of similar data within the Occoquan Watershed, however, provide a detailed basis for testing various hypotheses concerning pollutant transport, and may help to better understand the processes taking place.

Summary

The principal purpose of this study was to design and operate a series of water quality monitoring stations in small catchments. The design of the study was such that the data could then be used for multiple purposes: 1) characterization of nonpoint source pollution from various land uses; 2) comparison of selected management practices; and 3) calibration of mathematical pollutant transport models. Although an exhaustive analysis of the collected data base was beyond the purview of the project a significant effort has been made towards its interpretation. The mathematics modeling has been undertaken by others using this data base.

The distributions of the various data collected during this study were, in general, positively skewed. Because of this circumstance, frequent use was made of the median as a measure of central tendency of the populations. Extensive use was also made of box and whisker plots to illustrate the data distributions.

The observed pollutant concentrations were typically highest at the heavily-grazed pasture site, and lowest at the forest site (Table IV). Often the ranking of the other sites in terms of pollutant concentrations were, from highest to lowest, the croplands, the suburban area, and the lightly-grazed pasture.

Pollutant loadings in stormwater runoff were calculated in terms of kilograms per hectare per centimeter of precipitation. Frequently the heavily-grazed pasture or the suburban catchment displayed the highest loadings, while the forest areas had the lowest. Low loadings were also evident from the lightly-grazed pasture; the croplands were intermediate in

this respect (Table V). Median total suspended solids loadings ranged from 1170 kg/ha/cm P at site 1 to 126 kg/ha/cm P at site 5. Median total nitrogen loadings were 37.5 kg/ha/cm P at site 9. Site one had the highest median total phosphorus loadings (4.32 kg/ha/cm P), while site 5 had the lowest median loadings (0.635 kg/ha/cm P). Evidence was also found which indicated that the loading rates were dependent upon storm size (Figures 18-19). Although negligible lead concentrations were found, concentrations of zinc up to 460 ug/L were measured. The higher zinc values were primarily at one farm site and in the suburban catchment (Table VII).

Comparison of management practices indicated the heavily-grazed pasture consistently produced greater pollutant concentrations than the lightly-grazed pasture. Statistical differences in pollutant concentrations, at the 0.05 level of confidence using the Wilcoxon sum rank test, were found in the TN, TSN, TKN, ox-N, TP and TSS (Table IX). The similarity of these two sites in terms of soils and hydraulic efficiencies underscored the effect of management practices on pollutant export.

In comparing the no-till and minimum-till cropland site, statistically significant differences in observed concentrations were indicated with TN, TSN, ox-N, OP and TSP (Table X). These differences were related primarily to soluble nutrient forms. During the study, site 2 was converted from no-till management to a minimum-till approach. The data suggest that both pollutant concentrations and hydraulic efficiencies increased under the minimum-till management (Table XIV).

Initial study of the farm pond indicated removal efficiencies for suspended solids and nutrients to be over 85 percent. However, allowance was not made for pond storage capacity in these estimates. After a survey was conducted to establish that capacity, an ensuing drought precluded additional estimates from being made. Concentration data alone, however, indicated high removal efficiencies for TSS and TP (85% and 86%, respectively),and a relatively low removal efficiency of 34% for TN (Table XV).

Although 27 paired storms were monitored at the suburban detention pond site, the results were often contradictory. Because a satisfactory water balance could not be routinely made between the monitoring stations used, it was impossible to compare pollutant loadings with adequate confidence. The removal efficiency estimates based upon concentration alone were 1-72 percent. These removal efficiencies did not appear to be related to either precipitation amounts or flow.

The cleaning (maintenance) of the stormwater pond during this study provided an interesting contrast. The evidence suggests that removals of most pollutants were increased after the maintenance activity was completed (Tables XVI and XVII). After the cleaning, the nutrient content of solids emanating from the pond were found to be statistically different from those entering it (Table XVIII).

Atmospheric loadings were measured using a wetfall/dryfall collector located in an agricultural setting. Annualized pollutant loadings from wetfall were commonly found to exceed those from dryfall. More solids deposition resulted from dryfall, however; over 60 percent of the total load of 96.1 kg/ha/yr (Table XIX). Nutrient loadings were measured to be 16.82 kg/ha/yr for TN, and 0.651 kg/ha/yr for TP.

The pH of precipitation measured during this study was ordinarily in the range to warrant the term "acid" rain. The range of pH values observed was from 3.2-6.1, with a median value of 3.8. Indirect evidence suggested that sulfates were the causative factor.

The small catchments studied were all within the Occoquan Watershed. Similar studies of larger basins within the watershed were simultaneously carried out under the continuing mission of the Occoquan Watershed Monitoring Program. Comparison of these results indicated generally higher pollutant concentrations at the small catchment sites. Unit area loads, however, were in general higher at the stream sites, due to the greater hydraulic efficiencies of the larger basins.

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APPENDIX A-1

VARIABLE CODE NAMES USED IN DATA STORAGE

CODE	
STA	Station Identification Number (51CBXX)
STRMNO	Storm Number (day of year.storm sequence number)
TYPE	Type of Sample 1.0 Base Flow Samples 2.0 Storm Runoff Samples 3.0 Grab Samples
TI1	Date and Time Sample Taken (DDMMYY)--Datetime 13 format
TI2	Date and Time of Final Sample Collected (composited samples only)
HYD	Portion of Hydrograph During Which Sample Taken 1 Beginning 2 End 3 Peak 4 Dip 5 Rising 6 Falling
STG	Stage (feet)
FLO	Flow (cfs)
SAMNO	Number of Samples (for sequential samples includes order taken)
CMT	Comments (storm runoff only) 1.0 Complete Storm Sampled 2.0 Equipment Malfunctions 2.1 Flow Recorder 2.2 Sampler 2.3 External Sampling Line 2.4 Vandalism 2.5 Power Failure 3.0 Flow not Storm Generated 3.1 Snow Melt 3.2 Impoundment Release

4.0 Sample Lost
5.0 Frozen Lines or Equipment
6.0 Insufficient Stage Increase to Trigger Sampling

TSS	Total Suspended Solids (mg/L)
COD	Chemical Oxygen Demand (mg/L)
NH3	Soluble Ammonia (mg/L as N)
TKN	Total Kjeldahl Nitrogen (mg/L)
SKN	Soluble Kjeldahl Nitrogen (mg/L)
NO23	Soluble Nitrate Plust Nitrite (mg/L as N)=oxidized N
OP	Soluble Ortho Phosphorus (mg/L as P)
TSP	Total Soluble Phosphorus (mg/L as P)
TP	Total Phosphorus (mg/L as P)
TZN	Total Zinc (μg/l)
SZN	Soluble Zinc (μg/l)
TPB	Total Lead (μg/l)
SPB	Soluble Lead (μg/l)

APPENDIX A-2

FLOW AND CONCENTRATION DATA COLLECTED DURING RUNOFF EVENTS

STA=51CR01

OBS	STRMNO	TYPE	TI1	TI2	HYD	STG	FLO	SAMNO	CMT	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	TZN	SZN	TPB	SPB
1	143.0	2	23MAY79:05:45	.	1	0.30	0.2090	1.4	1.0	647.0	120.0	0.20	7.25	.	1.47	0.01	0.25	1.86	.	.	.	.
2	143.0	2	23MAY79:05:50	.	3	0.40	0.3630	2.4	1.0	1620.0	275.0	0.24	10.32	3.76	1.29	0.01	0.30	3.03	.	.	.	.
3	143.0	2	23MAY79:06:25	.	6	0.30	0.2090	3.4	1.0	343.0	89.6	0.34	6.43	1.50	1.40	0.01	0.25	1.47	.	.	.	.
4	143.0	2	23MAY79:08:35	.	2	0.20	0.0990	4.4	1.0	180.0	52.6	0.24	1.50	1.30	1.05	0.03	0.30	0.56	.	.	.	.
5	143.1	2	23MAY79:22:36	24MAY79:08:05	.	0.29	0.2000	6.0	1.0	975.0	167.0	0.15	5.61	1.50	1.28	0.02	0.25	1.52	.	.	.	.
6	145.0	2	25MAY79:02:00	.	1	0.30	0.2090	1.7	1.0	808.0	154.0	0.12	4.88	1.28	2.21	0.00	0.14	1.14	.	.	.	.
7	145.0	2	25MAY79:02:27	.	5	0.40	0.3630	2.7	1.0	689.0	127.0	0.10	4.24	1.52	1.93	0.01	0.16	1.03	.	.	.	.
8	145.0	2	25MAY79:02:32	.	3	0.50	0.5640	3.7	1.0	1200.0	210.0	0.16	6.96	1.28	1.25	0.02	0.16	1.85	.	.	.	.
9	145.0	2	25MAY79:03:12	.	3	0.50	0.5640	4.7	1.0	2170.0	318.0	0.22	8.40	1.44	0.89	0.03	0.18	3.21	.	.	.	.
10	145.0	2	25MAY79:03:30	.	6	0.40	0.3630	5.7	1.0	464.0	98.8	0.19	2.71	1.10	0.75	0.05	0.20	0.91	.	.	.	.
11	145.0	2	25MAY79:03:40	.	6	0.30	0.2090	6.7	1.0	124.0	49.5	0.16	2.16	1.36	1.09	0.04	0.18	0.35	.	.	.	.
12	145.0	2	25MAY79:04:30	.	2	0.25	0.1486	7.7	1.0	116.0	49.5	0.20	2.24	0.88	0.97	0.06	0.18	0.38	.	.	.	.
13	145.1	2	25MAY79:15:46	.	1	0.30	0.2090	1.6	1.0	197.0	25.8	0.10	1.91	.	2.36	0.00	0.15	0.54	.	.	.	.
14	145.1	2	25MAY79:15:49	.	5	0.40	0.3630	2.6	1.0	3630.0	414.0	0.14	11.45	2.20	1.36	0.01	0.20	3.83	.	.	.	.
15	145.1	2	25MAY79:15:51	.	5	0.50	0.5640	3.6	1.0	3320.0	493.0	0.10	20.70	1.78	1.15	0.01	0.20	5.01	.	.	.	.
16	145.1	2	25MAY79:15:53	.	3	0.60	0.8180	4.6	1.0	4140.0	338.0	0.12	14.19	.	0.91	0.01	0.31	5.83	.	.	.	.
17	145.1	2	25MAY79:16:45	.	6	0.50	0.5640	5.6	1.0	572.0	117.0	0.16	2.41	2.20	0.65	0.09	0.36	1.12	.	.	.	.
18	145.1	2	25MAY79:17:00	.	2	0.40	0.3630	6.6	1.0	176.0	51.0	0.22	1.71	0.68	0.94	0.07	0.30	0.59	.	.	.	.
19	151.0	2	31MAY79:21:10	01JUN79:08:50	.	0.59	0.7700	20.0	1.0	934.0	105.0	0.28	6.64	2.00	0.76	0.19	0.33	1.80	.	.	.	.
20	168.0	2	17JUN79:10:47	17JUN79:11:34	.	0.76	1.3500	13.0	1.0	1220.0	188.0	0.34	4.20	0.85	0.97	0.09	0.33	1.98	.	.	.	.
21	181.0	2	30JUN79:19:55	30JUN79:20:35	.	0.15	0.0600	2.0	1.0	523.0	.	0.14	3.34	.	2.01	0.02	0.07	1.08	.	.	.	.
22	182.0	2	01JUL79:16:25	01JUL79:17:20	.	0.15	0.0600	2.0	1.0	605.0	.	0.14	4.49	.	1.68	0.04	0.07	1.19	.	.	.	.
23	204.0	2	23JUL79:16:35	23JUL79:17:04	.	0.47	0.4900	9.0	1.0	1150.0	.	0.16	.	.	0.73	0.33	.	.	.	.	.	.
24	209.0	2	28JUL79:15:34	28JUL79:15:48	.	0.66	0.9800	6.0	2.1	1052.0	.	0.40	5.34	0.65	1.05	0.09	0.52	2.01	.	.	.	.
25	223.0	2	11AUG79:16:16	.	1	0.10	0.0298	1.3	1.0	460.0	97.5	0.24	3.51	1.13	1.37	0.53	0.67	1.60	.	.	.	.
26	223.0	2	11AUG79:16:28	.	3	0.20	0.0990	2.3	1.0	148.0	64.6	0.42	3.10	1.86	2.02	0.62	1.13	1.66	.	.	.	.
27	223.0	2	11AUG79:16:43	.	2	0.10	0.0298	3.3	1.0	51.0	64.6	0.42	2.17	1.65	2.35	0.59	0.67	0.89	.	.	.	.
28	231.0	2	19AUG79:16:37	.	1	0.05	0.0089	1.7	1.0	.	.	0.02	0.30	0.30	2.11	0.00	0.01	0.02	.	.	.	.
29	231.0	2	19AUG79:19:44	.	5	0.10	0.0298	2.7	1.0	9.0	.	0.04	0.39	0.39	2.15	0.00	0.01	0.03	.	.	.	.
30	231.0	2	19AUG79:22:58	.	3	0.15	0.0595	3.7	1.0	10.0	.	0.06	0.45	0.37	2.22	0.00	0.01	0.03	.	.	.	.
31	231.0	2	20AUG79:00:57	.	4	0.10	0.0298	4.7	1.0	6.2	.	0.02	0.33	0.33	2.24	0.00	0.01	0.02	.	.	.	.
32	231.0	2	20AUG79:03:57	.	3	0.15	0.0595	5.7	1.0	7.0	.	0.04	0.60	0.37	2.28	0.00	0.03	0.04	.	.	.	.
33	231.0	2	20AUG79:11:22	.	4	0.10	0.0298	6.7	1.0	.	.	0.90	3.84	1.62	2.11	0.10	0.17	0.53	.	.	.	.
34	231.0	2	20AUG79:12:50	.	2	0.13	0.0465	7.7	1.0	1.6	.	0.06	0.51	0.46	2.19	0.01	0.04	0.04	460	60	0	0
35	235.0	2	23AUG79:15:00	.	1	0.26	0.1597	1.5	1.0	406.0	.	0.04	2.87	0.60	1.50	0.01	0.03	0.79	.	.	.	.
36	235.0	2	23AUG79:15:30	.	3	0.30	0.2090	2.5	1.0	78.0	38.2	0.04	1.74	0.85	1.32	0.06	0.11	0.40	.	.	.	.
37	235.0	2	23AUG79:16:00	.	6	0.27	0.1713	3.5	1.0	51.0	19.6	0.06	1.86	1.09	1.69	0.06	0.10	0.28	.	.	.	.
38	235.0	2	23AUG79:16:30	.	6	0.24	0.1379	4.5	1.0	44.0	32.0	0.06	1.33	0.89	1.36	0.04	0.07	0.22	.	.	.	.
39	235.0	2	23AUG79:16:55	.	2	0.26	0.1597	5.5	1.0	34.0	25.8	0.08	1.09	0.69	1.36	0.02	0.03	0.15	.	.	.	.
40	248.0	2	05SEP79:13:40	06SEP79:00:40	.	0.59	0.7800	12.0	1.0	113.0	.	0.18	1.75	1.06	0.93	0.20	0.30	0.55	.	.	.	.
41	264.0	2	21SEP79:22:11	22SEP79:00:32	.	1.68	7.7000	9.0	1.0	447.0	22.7	0.06	2.84	0.69	0.43	0.01	0.44	1.34	.	.	.	.
42	14.0	2	14JAN80:13:10	.	1	0.31	0.2220	1.5	1.0	556.0	174.0	0.18	2.86	0.18	3.19	0.05	0.23	0.93	70	0	0	0
43	14.0	2	14JAN80:13:16	.	5	0.48	0.5200	2.5	1.0	1070.0	172.0	0.28	7.77	0.63	2.32	0.11	0.28	2.44	85	0	0	0
44	14.0	2	14JAN80:13:25	.	3	0.62	0.8750	3.5	1.0	2620.0	427.0	0.76	14.46	2.30	2.00	0.14	0.38	4.68	115	0	0	0
45	14.0	2	14JAN80:15:06	.	6	0.50	0.5640	4.5	1.0	542.0	175.0	0.96	5.87	2.53	1.59	0.45	0.53	1.56	60	0	0	0
46	14.0	2	14JAN80:16:09	.	2	0.36	0.2960	5.5	1.0	99.0	57.6	0.68	2.41	1.52	2.28	0.28	0.38	0.56	15	15	0	0
47	18.0	2	18JAN80:09:30	18JAN80:21:28	.	0.51	0.5700	5.0	1.0	146.0	.	0.18	1.79	0.90	2.32	0.10	0.13	0.42	.	.	.	.

APPENDIX A-2

FLOW AND CONCENTRATION DATA COLLECTED DURING RUNOFF EVENTS

STA=51CR01

OBS	STRMNO	TYPE	T1	T2	HYD	STG	FLO	SAMNO	CNT	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	TZN	SZN	TPB	SPB
48	73.0	2	13MAR80:14:30	14MAR80:11:00	.	0.26	0.1600	4.00	1	37.0	.	0.15	1.06	0.74	3.32	0.01	0.03	0.11	.	.	.	.
49	81.0	2	21MAR80:09:10	21MAR80:17:28	.	0.64	0.9400	8.00	1	2290.0	.	0.24	10.79	0.25	2.09	0.04	0.17	3.85	.	.	.	.
50	140.0	2	19MAY80:21:22	.	1	0.40	0.3630	1.70	1	.	20.0	0.15	1.19	0.62	3.78	0.02	0.04	0.25	.	.	.	.
51	140.0	2	19MAY80:21:26	.	5	0.50	0.5640	2.70	1	.	148.0	0.33	.	0.76	2.18	0.02	0.05	.	.	.	.	.
52	140.0	2	19MAY80:21:42	.	3	0.60	0.8180	3.70	1	.	412.0	0.43	.	0.91	1.71	0.08	0.10	.	.	.	.	.
53	140.0	2	19MAY80:21:49	.	6	0.50	0.5640	4.70	1	.	156.0	0.55	.	1.39	1.65	0.06	0.10	.	.	.	.	.
54	140.0	2	19MAY80:21:58	.	6	0.40	0.3630	5.70	1	.	86.0	0.51	4.25	1.39	1.44	0.08	0.10	1.14	.	.	.	.
55	140.0	2	19MAY80:22:13	.	6	0.30	0.2090	6.70	1	.	56.0	0.41	3.67	1.47	1.36	0.07	0.10	0.89	.	.	.	.
56	140.0	2	19MAY80:23:39	.	2	0.20	0.0990	7.70	1	.	72.0	0.35	2.26	1.11	1.59	0.06	0.09	0.47	.	.	.	.
57	185.0	2	03JUL80:14:07	03JUL80:16:45	.	0.31	0.2200	5.00	1	160.0	.	0.13	1.48	0.81	1.48	0.06	0.09	0.40	.	.	.	.
58	214.0	2	01AUG80:13:21	.	1	0.10	0.0298	1.90	1	692.0	80.0	0.07	.	.	1.19	0.01	.	.	.	.	.	.
59	214.0	2	01AUG80:13:50	.	5	0.20	0.0990	2.90	1	876.0	96.0	0.09	.	.	1.17	0.01	.	.	.	.	.	.
60	214.0	2	01AUG80:13:52	.	5	0.25	0.1486	3.90	1	918.0	112.0	0.11	.	.	1.23	0.02	.	.	.	.	.	.
61	214.0	2	01AUG80:13:53	.	5	0.30	0.2090	4.90	1	926.0	87.6	0.11	.	.	1.31	0.03	.	.	.	.	.	.
62	214.0	2	01AUG80:13:55	.	3	0.35	0.2800	5.90	1	492.0	76.7	0.17	.	.	1.13	0.09	.	.	.	.	.	.
63	214.0	2	01AUG80:14:09	.	6	0.30	0.2090	6.90	1	138.0	37.9	0.09	.	.	1.31	0.04	.	.	.	.	.	.
64	214.0	2	01AUG80:14:31	.	6	0.25	0.1486	7.90	1	62.0	27.9	0.09	.	.	1.25	0.03	.	.	.	.	.	.
65	214.0	2	01AUG80:14:50	.	6	0.20	0.0990	8.90	1	14.0	6.5	0.05	.	.	1.11	0.01	.	.	.	.	.	.
66	214.0	2	01AUG80:15:14	.	2	0.15	0.0595	9.90	1	29.0	10.9	0.07	.	.	1.53	0.01	.	.	.	.	.	.
67	261.0	2	17SEP80:22:14	18SEP80:00:47	.	0.28	0.1800	16.00	1	584.0	.	0.62	.	.	1.42	0.25	.	.	.	.	.	.
68	269.0	2	25SEP80:06:51	.	1	0.22	0.1176	1.30	1	202.0	78.0	0.18	2.27	0.76	0.63	0.10	0.12	0.74	.	.	.	.
69	269.0	2	25SEP80:09:42	.	6	0.12	0.0406	2.30	1	31.0	31.2	0.14	0.96	0.66	0.75	0.03	0.08	0.28	.	.	.	.
70	269.0	2	25SEP80:10:25	.	2	0.10	0.0298	3.30	1	13.3	24.8	0.13	0.72	0.66	0.65	0.02	0.06	0.12	.	.	.	.
71	299.0	2	25OCT80:05:16	25OCT80:11:20	.	0.27	0.1700	4.00	1	446.0	.	0.51	1.59	1.27	1.50	0.13	0.16	0.55	.	.	.	.
72	329.0	2	24NOV80:10:00	24NOV80:18:45	.	0.20	0.1000	5.00	1	255.0	.	0.86	3.78	1.99	1.20	0.12	0.19	0.88	.	.	.	.
73	42.0	2	11FEB81:00:48	.	1	0.22	0.1176	1.13	1	836.0	180.0	2.35	10.44	5.31	1.14	0.08	0.09	2.09	.	.	.	.
74	42.0	2	11FEB81:01:11	.	5	0.36	0.2650	2.13	1	1244.0	216.0	2.67	10.86	5.62	1.18	0.12	0.19	2.38	.	.	.	.
75	42.0	2	11FEB81:01:21	.	5	0.48	0.5200	3.13	1	1060.0	268.0	3.21	12.01	6.78	1.22	0.26	0.42	2.38	.	.	.	.
76	42.0	2	11FEB81:01:35	.	5	0.60	0.8180	4.13	1	404.0	164.0	2.85	10.02	6.88	2.06	0.35	0.51	1.61	.	.	.	.
77	42.0	2	11FEB81:02:30	.	4	0.50	0.5640	5.13	1	186.0	124.0	2.75	8.24	6.04	2.06	0.25	0.39	1.86	.	.	.	.
78	42.0	2	11FEB81:03:14	.	4	0.36	0.2960	6.13	1	654.0	176.0	2.97	5.46	5.14	1.66	0.22	0.37	1.71	.	.	.	.
79	42.0	2	11FEB81:03:37	.	5	0.45	0.4570	7.13	1	1132.0	172.0	2.75	8.98	5.28	1.52	0.26	.	2.09	.	.	.	.
80	42.0	2	11FEB81:03:42	.	5	0.58	0.7630	8.13	1	2452.0	364.0	2.59	11.36	3.05	1.48	0.25	.	2.38	.	.	.	.
81	42.0	2	11FEB81:03:50	.	5	0.82	1.5700	9.13	1	2568.0	344.0	2.37	9.51	4.07	1.52	0.23	0.42	2.38	.	.	.	.
82	42.0	2	11FEB81:04:01	.	3	1.00	2.4100	10.13	1	2226.0	376.0	2.33	11.56	4.79	1.54	0.25	0.51	1.61	.	.	.	.
83	42.0	2	11FEB81:06:42	.	6	0.64	0.9340	11.13	1	236.0	96.0	1.52	3.66	2.76	1.92	0.33	0.39	1.86	.	.	.	.
84	42.0	2	11FEB81:07:40	.	6	0.44	0.4370	12.13	1	130.0	100.0	1.48	3.77	3.15	1.92	0.36	0.37	1.71	.	.	.	.
85	42.0	2	11FEB81:13:10	.	2	0.20	0.0990	13.13	1	402.0	112.0	1.26	3.97	1.82	2.61	0.05	0.07	0.78	.	.	.	.
86	102.0	2	12APR81:18:20	13APR81:10:45	.	0.15	0.0595	3.00	1	25.0	.	0.08	0.88	0.65	2.15	0.01	0.04	0.06	.	.	.	.
87	121.0	2	01MAY81:10:10	01MAY81:13:45	.	0.18	0.0820	4.00	1	481.0	.	0.41	4.69	1.41	1.56	0.04	0.06	0.12	.	.	.	.
88	121.1	2	01MAY81:13:45	02MAY81:09:45	.	0.14	0.0528	3.00	1	61.0	.	0.14	1.50	1.10	1.52	0.02	0.07	0.24	.	.	.	.
89	131.0	2	11MAY81:22:18	11MAY81:23:28	.	0.68	1.0500	10.00	1	1780.0	.	0.61	17.68	2.63	1.18	0.09	0.11	4.80	.	.	.	.

APPENDIX A-2

FLOW AND CONCENTRATION DATA COLLECTED DURING RUNOFF EVENTS

-- STA=SICR02 --

OBS	STPNO	TYPE	TI		TI2	HYD	STG	FLO	SAMNO	CNT	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	TZN	SZN	TPB	SPB
90	145.0	2	25MAY79:03:30	25MAY79:06:25	.		0.12	0.0400	4.0	1.0	319.0	55.7	0.41	4.79	.	2.77	0.17	0.35	0.89	.	.	.	.
91	151.0	2	31MAY79:21:48	01JUN79:09:05	.		0.57	0.7400	19.0	2.2	538.0	95.8	0.85	6.24	3.76	7.07	0.69	0.77	1.93	.	.	.	.
92	214.0	2	02AUG79:17:27	02AUG79:18:53	.		0.54	0.6500	13.0	1.0	70.0	.	0.07	2.26	1.23	0.90	0.26	0.38	0.59	.	.	.	.
93	223.0	2	11AUG79:16:40		.	1	0.10	0.0248	1.3	1.0	88.0	31.8	0.06	1.56	0.72	2.43	0.10	0.19	0.46	.	.	.	.
94	223.0	2	11AUG79:16:43		.	3	0.20	0.0850	2.3	1.0	29.0	35.0	0.20	1.23	0.72	2.60	0.15	0.21	0.40	.	.	.	.
95	223.0	2	11AUG79:16:50		.	2	0.10	0.0248	3.3	1.0	127.0	25.2	0.22	1.03	0.92	2.04	0.26	0.29	0.39	.	.	.	.
96	233.0	2	21AUG79:02:05		.	1	0.05	0.0073	1.4	1.0	8.5	16.5	0.02	0.86	0.63	2.73	0.02	0.05	0.10	.	.	.	.
97	233.0	2	21AUG79:02:11		.	3	0.10	0.0248	2.4	1.0	20.3	16.5	0.12	1.16	0.82	2.62	0.09	0.13	0.17	.	.	.	.
98	233.0	2	21AUG79:02:22		.	4	0.05	0.0073	3.4	1.0	12.0	28.9	0.12	1.26	1.01	1.99	0.08	0.13	0.20	.	.	.	.
99	233.0	2	21AUG79:02:34		.	2	0.10	0.0248	4.4	1.0	5.5	25.8	0.08	1.13	0.86	2.24	0.06	0.11	0.16	.	.	.	.
100	233.1	2	21AUG79:11:07	21AUG79:12:15	.		0.23	0.1300	12.0	1.0	46.0	.	0.16	1.29	0.94	1.87	0.14	0.16	0.26	.	.	.	.
101	235.0	2	27AUG79:15:14		.	1	0.10	0.0248	1.4	4.0	.	.	.	.	.	.	.	.	.	.	.	.	.
102	235.0	2	27AUG79:15:17		.	3	0.15	0.0505	2.4	4.0	12.8	13.4	0.02	0.69	0.48	2.64	0.03	0.04	0.10	.	.	.	.
103	235.0	2	27AUG79:15:22		.	3	0.15	0.0505	3.4	4.0	10.4	19.6	0.08	1.07	0.71	1.99	0.07	0.09	0.15	.	.	.	.
104	235.0	2	27AUG79:15:33		.	2	0.10	0.0248	4.4	4.0	5.2	13.4	0.04	0.51	0.45	2.50	0.01	0.04	0.04	.	.	.	.
105	239.0	2	27AUG79:15:33	27AUG79:16:08	.		0.18	0.0800	3.0	1.0	6.0	.	0.18	1.22	1.22	2.53	0.08	0.10	0.13	.	.	.	.
106	248.0	2	05SEP79:15:00	06SEP79:14:00	.		0.64	0.8500	17.0	1.0	290.0	.	0.30	2.92	1.06	1.44	0.30	0.38	2.13	.	.	.	.
107	264.0	2	21SEP79:21:56	22SEP79:00:34	.		1.44	5.0700	8.0	1.0	351.0	86.8	0.12	3.51	1.11	1.21	0.36	0.39	1.07	.	.	.	.
108	274.0	2	01OCT79:02:40	01OCT79:05:51	.		1.37	4.5500	10.0	1.0	622.0	.	0.19	4.65	1.88	1.27	0.34	.	.	.	.	.	.
109	18.0	2	18JAN80:09:30		.	1	0.16	0.0567	1.5	1.0	559.0	109.0	0.13	4.01	1.49	13.75	0.05	0.05	1.05	35	0	0	0
110	18.0	2	18JAN80:15:58		.	5	0.30	0.1830	2.5	1.0	1980.0	143.0	0.07	.	1.18	9.52	0.01	0.09	.	235	0	0	0
111	18.0	2	18JAN80:20:38		.	3	0.40	0.3230	3.5	1.0	53.0	19.5	0.03	0.87	0.51	5.87	0.00	0.04	0.19	20	0	0	0
112	18.0	2	19JAN80:14:10		.	6	0.30	0.1830	4.5	1.0	109.0	29.1	0.07	1.90	1.13	16.44	0.01	0.05	0.23	0	0	0	0
113	18.0	2	22JAN80:08:45		.	2	0.18	0.0701	5.5	1.0	59.0	21.4	0.03	1.56	1.04	16.63	0.01	0.04	0.15	0	0	0	0
114	81.0	2	21MAR80:09:30	21MAR80:16:00	.		0.42	0.3500	4.0	1.0	788.0	.	0.18	3.13	0.58	7.89	0.02	0.05	0.83	.	.	.	.
115	100.0	2	09APR80:01:47		.	1	0.40	0.3230	1.5	1.0	24.5	0.0	0.04	0.67	0.14	5.47	0.00	0.02	0.05	.	.	.	.
116	100.0	2	09APR80:02:10		.	5	0.50	0.5090	2.5	1.0	336.0	51.0	0.10	3.10	0.86	3.50	0.01	0.03	0.66	.	.	.	.
117	100.0	2	09APR80:02:55		.	3	0.60	0.7450	3.5	1.0	722.0	110.0	0.18	5.45	0.74	3.50	0.04	0.11	1.86	.	.	.	.
118	100.0	2	09APR80:05:35		.	6	0.50	0.5090	4.5	1.0	479.0	70.6	0.08	3.74	0.66	6.07	0.01	0.07	1.13	.	.	.	.
119	100.0	2	09APR80:12:00		.	7	0.40	0.3230	5.5	1.0	16.0	7.8	0.08	0.70	0.41	4.99	0.01	0.05	0.09	.	.	.	.
120	105.0	2	14APR80:10:00	14APR80:17:58	.		0.31	0.1900	3.0	1.0	1126.	.	0.24	8.65	1.13	4.03	0.02	0.11	2.55	.	.	.	.
121	167.0	2	15JUN80:16:37	15JUN80:17:10	.		0.32	0.2000	4.0	1.0	72.0	.	0.20	2.50	1.06	2.69	0.07	0.11	0.35	.	.	.	.
122	214.0	2	01AUG80:13:47		.	1	0.05	0.0073	1.4	1.0	648.0	156.0	0.29	.	.	0.37	0.01	.	.	.	.	.	.
123	214.0	2	01AUG80:13:52		.	5	0.10	0.0248	2.4	1.0	350.0	61.8	0.19	.	.	0.95	0.03	.	.	.	.	.	.
124	214.0	2	01AUG80:13:57		.	3	0.15	0.0505	3.4	1.0	129.0	44.8	0.21	.	.	1.71	0.08	.	.	.	.	.	.
125	214.0	2	01AUG80:14:10		.	2	0.12	0.0341	4.4	1.0	19.5	35.8	0.17	.	.	1.75	0.08	.	.	.	.	.	.
126	42.0	2	11FEB81:04:12		.	1	0.16	0.0567	1.4	1.0	350.0	88.0	0.39	4.42	2.70	5.95	0.14	0.24	0.90	.	.	.	.
127	42.0	2	11FEB81:04:23		.	3	0.27	0.1496	2.4	1.0	262.0	120.0	0.45	4.87	3.16	9.37	0.20	0.28	0.73	.	.	.	.
128	42.0	2	11FEB81:04:52		.	6	0.16	0.0567	3.4	1.0	28.0	78.1	0.41	3.43	2.97	11.99	0.13	0.19	0.28	.	.	.	.
129	42.0	2	11FEB81:06:21		.	2	0.12	0.0341	4.4	1.0	2.0	60.1	0.29	2.31	2.06	10.78	0.10	0.15	0.16	.	.	.	.
130	131.0	2	11MAY81:22:27	11MAY81:22:51	.		0.09	0.0205	3.0	1.0	58.0	.	0.25	1.85	0.91	2.28	0.02	0.06	0.12	.	.	.	.

APPENDIX A-2

FLOW AND CONCENTRATION DATA COLLECTED DURING RUNOFF EVENTS

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------------------------------------------------------------ STA=51CR03 -------------------------------------------------------------
RS STRMNO TYPE       TI1                      TI2 HYD STG   FLO   SAMNO CMT TSS   COD   NH3  TKN  SKN  NO23  OP   TSP   TP    T7N S7N TPR SPR

31  248    2    05SEP79:14:10                  .   1  0.10 0.0248  1.3   |    14  77.7 0.56 3.38 2.57 0.34 0.42 0.58 0.74    .   .   .   .
32  248    2    05SEP79:16:10                  .   3  0.25 0.1290  2.3   |     4  59.5 0.36 1.93 1.77 0.22 0.62 0.76 0.86    .   .   .   .
33  248    2    05SEP79:19:05                  .   2  0.16 0.0567  3.3   |     4  44.4 0.28 1.32 1.22 0.28 0.29 0.38 0.40    .   .   .   .
34  100    2    09APR80:03:18                  .   1  0.22 0.1015  1.4   |   176 257.0 2.73 8.68 7.12 0.39 1.10 1.50 1.86    .   .   .   .
35  100    2    09APR80:04:06                  .   3  0.42 0.3560  2.4   |    56 206.0 1.96 5.99 4.61 0.27 0.52 1.39 1.73    .   .   .   .
36  100    2    09APR80:04:56                  .   6  0.32 0.2070  3.4   |    26 194.0 1.72 4.74 3.74 0.27 0.88 0.92 1.16    .   .   .   .
37  100    2    09APR80:05:23                  .   2  0.15 0.0505  4.4   |    28     . 1.54    .    . 0.97 0.60    .    .    .   .   .   .
38  167    2    15JUN80:16:56 15JUN80:17:06   .   .  0.27 0.1500  3.0   |    45     . 0.26 4.04 2.01 0.84 0.71 0.95    .    .   .   .   .

------------------------------------------------------------ STA=51CR04 -------------------------------------------------------------
S STRMNO TYPE       TI1                      TI2 HYD STG   FLO   SAMNO CMT  TSS   COD   NH3  TKN  SKN  NO23  OP   TSP   TP    T7N S7N TPR SPR

9   145    2    25MAY79:03:32                  .   1  0.10 0.0248  1.6  1.0 173.0  71.1 2.31 6.03 3.65 0.32 0.04 0.14 0.51    .   .   .   .
0   145    2    25MAY79:03:40                  .   5  0.20 0.0850  2.6  1.0 126.0  64.9 2.31 5.85 3.69 0.28 0.04 0.13 0.45    .   .   .   .
1   145    2    25MAY79:03:43                  .   3  0.30 0.1830  3.6  1.0 110.0  71.1 2.39 6.07 4.10 0.32 0.05 0.15 0.42    .   .   .   .
2   145    2    25MAY79:03:53                  .   6  0.20 0.0850  4.6  1.0 115.0  68.0 2.31 5.58 3.69 0.28 0.04 0.13 0.42    .   .   .   .
3   145    2    25MAY79:03:57                  .   6  0.10 0.0248  5.6  1.0  95.0  68.0 2.26 5.35 3.78 0.27 0.03 0.13 0.39    .   .   .   .
4   145    2    25MAY79:04:15                  .   2  0.10 0.0248  6.6  1.0  79.0  55.7 2.29 5.53 4.32 0.20 0.06 0.15 0.37    .   .   .   .
5   151    2    01JUN79:02:56 01JUN79:05:38   .   .  0.60 0.7500  6.0  2.2 258.0  60.5 1.39 5.56 3.44 0.88 0.07 0.16 0.68    .   .   .   .
6   214    2    02AUG79:17:52 02AUG79:18:10   .   .  0.15 0.0500  2.0  2.1 372.0     . 0.58 5.63 2.53 0.88 0.09 0.25 0.95    .   .   .   .
7   233    2    21AUG79:01:50 21AUG79:03:52   .   .  0.09 0.0200  3.0  1.0  94.0     . 0.56 5.86 1.91 0.52 0.06 0.09 0.42    .   .   .   .
8   235    2    23AUG79:14:52 23AUG79:16:56   .   .  0.06 0.0100  5.0  1.0 120.0     . 0.42 5.06 1.88 0.50 0.04 0.07 0.42    .   .   .   .
9   237    2    25AUG79:17:43 25AUG79:17:47   .   .  0.13 0.0400  2.0  1.0 120.0     . 0.18 4.89 1.66 0.42 0.03 0.11 0.45    .   .   .   .
0   239    2    27AUG79:16:08 27AUG79:20:28   .   .  0.13 0.0400  2.0  1.0  62.0     . 0.58 4.60 1.87 0.40 0.04 0.08 0.32    .   .   .   .
1   248    2    05SEP79:15:20 06SEP79:10:30   .   .  0.35 0.2500  9.0  1.0  45.0     . 0.62 2.31 1.41 0.56 0.08 0.13 0.29    .   .   .   .
2   274    2    01OCT79:03:10 01OCT79:05:32   .   .  0.79 1.3600  4.0  1.0 284.0     . 0.25 2.56 1.37 0.86 0.09    .    .    .   .   .   .
3    18    2    18JAN80:10:07                  .   1  0.20 0.0850  1.5  1.0  19.0   9.0 0.09 0.37 0.29 7.99 0.01 0.05 0.07    0   0   0   0
4    18    2    18JAN80:14:00                  .   5  0.30 0.1830  2.5  1.0  17.0  16.6 0.07 0.66 0.46 2.72 0.01 0.07 0.09    0   0   0   0
5    18    2    18JAN80:16:18                  .   3  0.40 0.3230  3.5  1.0  14.0  24.2 0.09 0.85 0.66 3.07 0.03 0.07 0.11   10   0   0   0
6    18    2    19JAN80:04:23                  .   6  0.30 0.1830  4.5  1.0  13.0  20.4 0.11 0.79 0.66 3.22 0.03 0.08 0.10    0   0   0   0
7    18    2    22JAN80:09:10                  .   2  0.22 0.1015  5.5  1.0  15.5  20.4 0.13 0.97 0.77 3.21 0.03 0.07 0.11    0   0   0   0

------------------------------------------------------------ STA=51CR05 -------------------------------------------------------------

      S                                            S                                    N
      T                                            A                                    O
      R  T                                         M                                    2
  O   M  Y    T                    T H  S    F     N   C     T      C     N    T    S   3     O    T     T     T S T S
  B   N  P    I                    I Y  T    L     O   M     S      O     H    K    K         P    S     P     7 7 P P
  S   O  E    1                    2 D  G    O         T     S      D     3    N    N              P           N N R R

 158 151 2 31MAY79:23:05 01JUN79:02:44 . . 0.42 0.8100 17.0 |   13.4  31.0 0.14 1.35 1.06 0.01 0.04 0.07 0.11   . . . .
 159 248 2 05SEP79:15:25               . 1 0.34 0.2340  1.2 |   14.0  80.8 0.28 1.87 1.10 0.09 0.10 0.26 0.33   . . . .
 160 248 2 05SEP79:18:50               . 2 0.40 0.3230  2.2 |   10.0  68.6 0.10 1.51 0.89 0.07 0.06 0.16 0.26   . . . .
 161 274 2 01OCT79:02:43 01OCT79:08:15 . . 0.67 0.9500 10.0 |   13.6     . 0.14 0.96 0.78 0.31 0.13    .    .   . . . .
 162 275 2 02OCT79:22:00 03OCT79:03:27 . . 0.25 0.1300  3.0 |    3.0     . 0.09 0.95 0.81 0.13 0.02 0.05 0.07   . . . .
 163 278 2 05OCT79:08:00 05OCT79:16:39 . . 0.46 0.4200  7.0 |    8.0     . 0.17 1.14 0.97 0.71 0.07    .    .   . . . .
 164 282 2 09OCT79:02:41 09OCT79:07:45 . . 0.22 0.1000  4.0 |    4.0     . 0.09 0.69 0.60 0.17 0.02    .    .   . . . .
 165  18 2 18JAN80:13:55               . 1 0.20 0.0850  1.1 |  186.0  44.1 0.26 2.98 1.19 0.31 0.01 0.07 0.55  10 0 0 0
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APPENDIX A-2

FLOW AND CONCENTRATION DATA COLLECTED DURING RUNOFF EVENTS

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------------------------------------------------------------ STA=SICR05 ------------------------------------------------------------
     S
     T                                                 S
     R  T                                              A                                  N
 O   M  Y       T                    T H   S     F     M C      T     C    N    T    S    O         T        T S T S
 B   N  P       I                    I Y   T     L     N M      S     O    H    K    K    2    O    S    T   Z Z P P
 S   O  E       1                    2 D   G     O     O T      S     D    3    N    N    3    P    P    P   N N B B

166  18 2 18JAN80:19:20              . 3 0.40 0.3230 2.3 |   156.0  44.3 0.24 2.36 1.32 0.25 0.06 0.09 0.33 15 0 0 0
167  18 2 19JAN80:00:28              . 2 0.20 0.0850 3.3 |    58.0  29.2 0.16 1.42 1.02 0.41 0.07 0.10 0.20  0 0 0 0
168  81 2 21MAR80:09:45              . 1 0.30 0.1830 1.8 |    97.0     . 0.16 1.45 1.05 0.37 0.02 0.07 0.14  . . . .
169  81 2 21MAR80:10:45              . 5 0.40 0.3230 2.8 |  1650.0     . 0.24 6.49 1.16 0.21 0.02 0.09 1.62  . . . .
170  81 2 21MAR80:10:50              . 5 0.50 0.5090 3.8 |  1690.0     . 0.26 7.26 0.79 0.19 0.03 0.10 2.07  . . . .
171  81 2 21MAR80:10:55              . 3 0.60 0.7450 4.8 |  1600.0     . 0.24 8.49 1.12 0.17 0.03 0.07 2.35  . . . .
172  81 2 21MAR80:11:45              . 6 0.50 0.5090 5.8 |   602.0     . 0.28 3.95 1.50 0.17 0.11 0.13 0.81  . . . .
173  81 2 21MAR80:12:15              . 6 0.40 0.3230 6.8 |   324.0     . 0.34 2.92 1.68 0.19 0.12 0.12 0.53  . . . .
174  81 2 21MAR80:12:40              . 6 0.30 0.1830 7.8 |   169.0     . 0.28 2.22 1.58 0.21 0.12 0.12 0.29  . . . .
175  81 2 21MAR80:14:15              . 2 0.20 0.0850 8.8 |   141.0     . 0.18 1.89 1.63 0.27 0.07 0.09 0.21  . . . .
176  91 2 31MAR80:04:15              . 1 0.10 0.0248 1.2 |   210.0     . 0.16 2.27 0.57 0.52 0.00 0.07 0.48  . . . .
177  91 2 31MAR80:07:00              . 2 0.20 0.0850 2.2 |    74.0     . 0.16 1.02 0.57 0.52 0.00 0.06 0.14  . . . .
178 100 2 09APR80:03:00              . 1 0.10 0.0248 1.4 |   142.0     . 0.16 1.60 0.73 0.17 0.01 0.03 0.18  . . . .
179 100 2 09APR80:03:45              . 3 0.20 0.0850 2.4 |   113.0     . 0.22 2.18 0.90 0.11 0.01 0.06 0.21  . . . .
180 100 2 09APR80:05:30              . 6 0.10 0.0248 3.4 |    21.0     . 0.14 1.23 0.86 0.13 0.01 0.06 0.08  . . . .
181 100 2 09APR80:11:50              . 2 0.04 0.0050 4.4 |    21.5     . 0.14 1.26 0.78 0.11 0.01 0.03 0.08  . . . .
182 105 2 14APR80:09:30  15APR80:14:05 . 0.06 0.0100 3.0 |    90.0     . 0.26 1.80 0.93 0.18 0.01 0.06 0.22  . . . .
183  42 2 11FEB81:03:48              . 1 0.05 0.0073 1.2 |   141.0 138.0 0.66    .    . 0.55 0.18 0.36 0.70  . . . .
184  42 2 11FEB81:07:35              . 2 0.05 0.0073 2.2 |   114.0 162.0 0.68    .    . 0.49 0.17 0.35 0.68  . . . .

------------------------------------------------------------ STA=SICR07 ------------------------------------------------------------
OBS STRMNO TYPE       TI1       TI2 HYD STG   FLO  SAMNO CMT    TSS   COD  NH3   TKN  SKN  NO23  OP  TSP   TP  TZN SZN TPB SPB

185 162.0    2   11JUN79:05:25    .   1 0.10 0.1790   1.3   |  566.0 503.0 1.13  4.73 2.20 2.64 0.00 0.31 1.02  .   .   .   .
186 162.0    2   11JUN79:05:34    .   3 0.20 0.7940   2.3   |  382.0 173.0 0.42  2.83    . 0.73 0.00 0.26 0.66  .   .   .   .
187 162.0    2   11JUN79:06:20    .   2 0.10 0.1790   3.3   |   52.0  60.6 0.46  1.78    . 0.79 0.00 0.20 0.31  .   .   .   .
188 162.1    2   11JUN79:08:48    .   1 0.20 0.7940   1.2   |   68.0  68.7 0.28  4.31    . 0.82 0.01 0.26 0.77  .   .   .   .
189 162.1    2   11JUN79:09:16    .   2 0.10 0.1790   2.2   |   24.0  66.8 0.30  2.20 0.94 0.73 0.02 0.26 0.41  .   .   .   .
190 168.0    2   17JUN79:04:45    .   1 0.10 0.1790   1.7   | 1020.0 496.0 0.24  9.82 1.87 0.40 0.00 0.23 2.13  .   .   .   .
191 168.0    2   17JUN79:05:00    .   5 0.20 0.7940   2.7   |  302.0 159.0 0.08 11.68    . 0.45 0.00 0.23 1.13  .   .   .   .
192 168.0    2   17JUN79:05:04    .   5 0.30 1.8900   3.7   |  502.0 162.0 0.10  7.32    . 0.35 0.00 0.23 1.43  .   .   .   .
193 168.0    2   17JUN79:05:07    .   3 0.40 3.4800   4.7   |  260.0  71.8 0.06  1.91    . 0.14 0.00 0.23 0.58  .   .   .   .
194 168.0    2   17JUN79:05:12    .   6 0.30 1.8900   5.7   |   95.0  56.2 0.10  3.78    . 0.28 0.05 0.28 0.73  .   .   .   .
195 168.0    2   17JUN79:05:22    .   6 0.20 0.7940   6.7   |   59.0  43.7 0.06  1.28 0.87 0.38 0.02 0.18 0.33  .   .   .   .
196 168.0    2   17JUN79:05:57    .   2 0.10 0.1790   7.7   |  128.0  78.0 0.08  2.95    . 0.32 0.01 0.18 0.53  .   .   .   .
197 168.1    2   17JUN79:09:55    .   1 0.20 0.7940   1.3   |  175.0 111.0 0.12  1.37 0.47 0.29 0.01 0.09 0.45  .   .   .   .
198 168.1    2   17JUN79:10:13    .   3 0.20 0.7940   2.3   |   59.0  54.1 0.12  1.47 0.58 0.25 0.01 0.11 0.21  .   .   .   .
199 168.1    2   17JUN79:10:52    .   2 0.10 0.1790   3.3   |   15.0  41.5 0.06  0.58 0.36 0.32 0.01 0.11 0.16  .   .   .   .
200 174.0    2   23JUN79:21:08    .   1 0.10 0.1790   1.5   |  488.0 406.0 0.30  5.09    . 0.59 0.01 0.13 0.83  .   .   .   .
201 174.0    2   23JUN79:21:09    .   5 0.20 0.7940   2.5   |  537.0 266.0 0.06  6.92    . 0.41 0.02 0.38 1.66  .   .   .   .
202 174.0    2   23JUN79:21:15    .   3 0.30 1.8900   3.5   |  216.0 101.0 0.04  4.28    . 0.68 0.00 0.28 0.73  .   .   .   .
203 174.0    2   23JUN79:21:21    .   6 0.20 0.7940   4.5   |   68.0  86.5 0.10  2.86 1.64 1.28 0.01 0.13 0.43  .   .   .   .
204 174.0    2   23JUN79:21:55    .   2 0.10 0.1790   5.5   |   18.0  51.0 0.12  1.23    . 1.08 0.01 0.13 0.23  .   .   .   .
205 179.0    2   28JUN79:22:10    .   1 0.20 0.7940   1.2   |   67.0     . 0.15  1.42    . 0.58 0.00 0.04 0.26  .   .   .   .
206 179.0    2   28JUN79:23:02    .   2 0.10 0.1790   2.2   |   65.0     . 0.08  0.50 0.38 0.70 0.00 0.04 0.15  .   .   .   .
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                                                          APPENDIX A-2
                                      FLOW AND CONCENTRATION DATA COLLECTED DURING RUNOFF EVENTS
---------------------------------------------------------------- STA=51CR07 ----------------------------------------------------------------
 OBS STRMNO TYPE      TI1        TI2 HYD STG       FLO SAMNO CMT    TSS COD   NH3  TKN  SKN  NO23 OP    TSP  TP    T7N S7N TPR SPR

 207  185.0   2   04JUL79:12:35   .   1  0.10   0.1790  1.5   |    98.0  .   0.09 1.27  .   0.72 0.01 0.04 0.22   .   .   .   .
 208  185.0   2   04JUL79:12:38   .   5  0.20   0.7940  2.5   |   112.0  .   0.11 1.37 0.83 1.14 0.01 0.07 0.25   .   .   .   .
 209  185.0   2   04JUL79:13:00   .   3  0.30   1.8900  3.5   |    34.0  .   0.13 0.93 0.73 0.85 0.02 0.07 0.14   .   .   .   .
 210  185.0   2   04JUL79:14:55   .   6  0.20   0.7940  4.5   |    29.0  .   0.09 1.27 1.27 0.81 0.02 0.07 0.12   .   .   .   .
 211  185.0   2   04JUL79:16:20   .   2  0.20   0.7940  5.5   |    36.0  .   0.05 1.59 0.73 0.57 0.02 0.07 0.07   .   .   .   .
 212  231.0   2   19AUG79:20:17   .   1  0.15   0.4290  1.6   |   157.0  .   0.04 2.81 0.45 0.87 0.00 0.06 0.56   .   .   .   .
 213  231.0   2   19AUG79:20:22   .   5  0.25   1.2800  2.6   |   160.0  .   0.18 1.79 0.49 0.81 0.00 0.03 0.27   .   .   .   .
 214  231.0   2   19AUG79:20:28   .   3  0.45   4.4600  3.6   |   173.0  .   0.18 2.40 0.65 0.71 0.00 0.03 0.34   .   .   .   .
 215  231.0   2   19AUG79:20:36   .   3  0.45   4.4600  4.6   |    91.0  .   0.10 1.14 0.37 0.52 0.00 0.03 0.17   .   .   .   .
 216  231.0   2   19AUG79:20:44   .   6  0.25   1.2800  5.6   |    50.0  .   0.08 0.86 0.65 0.65 0.00 0.03 0.11   .   .   .   .
 217  231.0   2   19AUG79:20:50   .   2  0.15   0.4290  6.6   |    38.0  .   0.02 0.82 0.65 0.65 0.00 0.03 0.10   .   .   .   .
 218  233.0   2   21AUG79:01:35   .   1  0.05   0.0401  1.7   |   115.0  .   0.25 2.39 0.98 2.58 0.02 0.11 0.85   .   .   .   .
 219  233.0   2   21AUG79:01:47   .   5  0.10   0.1790  2.7   |    52.0  .   0.23 0.86  .   0.99 0.00 0.04 0.15   .   .   .   .
 220  233.0   2   21AUG79:01:52   .   5  0.15   0.4290  3.7   |    34.0  .   0.29 1.11 0.69 1.86 0.01 0.07 0.15   .   .   .   .
 221  233.0   2   21AUG79:03:05   .   3  0.20   0.7940  4.7   |    14.4  .   0.17 0.45 0.36 0.86 0.01 0.05 0.06   .   .   .   .
 222  233.0   2   21AUG79:03:47   .   6  0.15   0.4290  5.7   |     8.0  .   0.19 1.07 0.53 0.73 0.01 0.04 0.05   .   .   .   .
 223  233.0   2   21AUG79:04:00   .   6  0.10   0.1790  6.7   |     5.2  .   0.19 0.98  .   0.71 0.01  .   0.06   .   .   .   .
 224  233.0   2   21AUG79:04:58   .   2  0.05   0.0401  7.7   |     4.0  .   0.10 0.53 0.53 0.44 0.01 0.03 0.04   .   .   .   .
 225  236.0   2   24AUG79:19:04   .   1  0.15   0.4290  1.5   |   604.0  .   0.18 6.89 1.97 0.24 0.00 0.13 1.29   .   .   .   .
 226  236.0   2   24AUG79:19:11   .   5  0.30   1.8900  2.5   |   223.0  .   0.10 3.00 0.95 0.55 0.00 0.11 0.48   .   .   .   .
 227  236.0   2   24AUG79:19:17   .   3  0.45   4.4600  3.5   |   103.0  .   0.20 1.87 0.95 0.59 0.00 0.13 0.36   .   .   .   .
 228  236.0   2   24AUG79:19:25   .   6  0.30   1.8900  4.5   |    66.0  .   0.18 1.46 0.86 0.44 0.00 0.11 0.26   .   .   .   .
 229  236.0   2   24AUG79:19:47   .   2  0.10   0.1790  5.5   |    23.5  .   0.22 1.36 0.85 0.36 0.01 0.13 0.23   .   .   .   .
 230  236.1   2   24AUG79:19:57   .   1  0.15   0.4290  1.7   |   142.0  .   0.16 2.04 0.59 0.65 0.00 0.03 0.26   .   .   .   .
 231  236.1   2   24AUG79:19:59   .   3  0.30   1.8900  2.7   |   136.0  .   0.22 2.41 0.51 0.67 0.00 0.03 0.25   .   .   .   .
 232  236.1   2   24AUG79:20:04   .   4  0.20   0.7940  3.7   |    51.0  .   0.18 1.20 0.59 0.67 0.01 0.04 0.15   .   .   .   .
 233  236.1   2   24AUG79:20:06   .   5  0.25   1.2800  4.7   |    57.0  .   0.14 1.26 0.45 0.53 0.01 0.03 0.17   .   .   .   .
 234  236.1   2   24AUG79:20:08   .   3  0.45   4.4600  5.7   |   288.0  .   0.12 2.20 0.57 0.61 0.03 0.04 0.33   .   .   .   .
 235  236.1   2   24AUG79:20:11   .   3  0.45   4.4600  6.7   |   132.0  .   0.14 1.83 0.56 0.67 0.03 0.04 0.24   .   .   .   .
 236  236.1   2   24AUG79:20:20   .   2  0.35   2.6200  7.7   |    81.0  .   0.14 1.46 0.86 0.67 0.06 0.10 0.22   .   .   .   .
 237  237.0   2   25AUG79:19:08   .   1  0.05   0.0401  1.3   |    58.0  .   0.22 0.67 0.41 1.13 0.00 0.04 0.04   .   .   .   .
 238  237.0   2   25AUG79:19:28   .   3  0.10   0.1790  2.3   |    13.5  .   0.10 0.70 0.35 0.70 0.00 0.03 0.10   .   .   .   .
 239  237.0   2   25AUG79:20:37   .   2  0.05   0.0401  3.3   |     7.8  .    .    .    .    .    .    .    .     .   .   .   .
 240  238.0   2   26AUG79:03:12   .   1  0.10   0.1790  1.5   |   136.0  .   0.15 1.44 1.32 0.70 0.03 0.07 0.20   .   .   .   .
 241  238.0   2   26AUG79:03:14   .   5  0.20   0.7940  2.5   |    55.0  .   0.05 0.93 0.82 0.30 0.01 0.04 0.11   .   .   .   .
 242  238.0   2   26AUG79:03:23   .   5  0.30   1.8400  3.5   |    64.0  .   0.07 0.86 0.61 0.32 0.02 0.05 0.12   .   .   .   .
 243  238.0   2   26AUG79:03:40   .   3  0.45   4.4600  4.5   |    47.0  .   0.09 1.51 0.89 0.36 0.06 0.08 0.14   .   .   .   .
 244  238.0   2   26AUG79:03:48   .   2  0.40   3.4800  5.5   |    45.0  .   0.11 1.28 0.95 0.34 0.09 0.10 0.17   .   .   .   .
 245  248.0   2   05SEP79:11:10   .   1  0.50   5.5700  1.9   |    46.0  .   0.04 0.83 0.21 0.22 0.01 0.04 0.09   .   .   .   .
 246  248.0   2   05SEP79:11:15   .   3  1.00  23.3000  2.9   |    64.0  .   0.04 1.15 0.25 0.22 0.01 0.03 0.15   .   .   .   .
 247  248.0   2   05SEP79:13:00   .   4  0.50   5.5700  3.9   |    44.0  .   0.12 0.97 0.70 0.32 0.10 0.14 0.21   .   .   .   .
 248  248.0   2   05SEP79:14:15   .   3  1.00  23.3000  4.9   |    55.0  .   0.16 1.26 0.91 0.36 0.15 0.20 0.27   .   .   .   .
 249  248.0   2   05SEP79:17:30   .   4  0.40   3.4800  5.9   |    19.2  .   0.10 0.85 0.64 0.36 0.10 0.13 0.18   .   .   .   .
 250  248.0   2   05SEP79:19:30   .   3  0.90  18.8000  6.9   |   152.0  .   0.16 0.71 0.42 0.26 0.10 0.11 0.21   .   .   .   .
 251  248.0   2   05SEP79:20:30   .   4  0.85  16.8000  7.9   |    55.0  .   0.08 0.58 0.44 0.26 0.11 0.13 0.19   .   .   .   .
 252  248.0   2   05SEP79:21:30   .   3  1.00  23.3000  8.9   |    39.0  .   0.10 0.66 0.66 0.28 0.10 0.13 0.20   .   .   .   .
 253  248.0   2   05SEP79:22:30   .   2  0.35   2.6200  9.9   |    22.8  .   0.10 0.74 0.52 0.42 0.08 0.10 0.15   .   .   .   .
 254  264.0   2   21SEP79:23:08   .   1  0.25   1.2800  1.5   |    52.0 25.8 0.03 0.94 0.36 0.28 0.05 0.11 0.26   .   .   .   .
 255  264.0   2   22SEP79:00:06   .   5  0.75  13.0000  2.5   |   149.0 38.2 0.09 1.77 0.65 0.31 0.12 0.13 0.37   .   .   .   .
 256  264.0   2   22SEP79:00:09   .   3  1.00  23.3000  3.5   |   309.0 53.6 0.09 2.05 0.55 0.27 0.08 0.11 0.53   .   .   .   .
 257  264.0   2   22SEP79:00:17   .   6  0.75  13.0000  4.5   |   126.0 35.1 0.09 1.63 0.65 0.29 0.15 0.17 0.38   .   .   .   .
 258  264.0   2   22SEP79:00:25   .   2  0.50   5.5700  5.5   |    88.0 22.7 0.25 1.14 0.75 0.35 0.19 0.19 0.31   .   .   .   .
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APPENDIX A-2

FLOW AND CONCENTRATION DATA COLLECTED DURING RUNOFF EVENTS

-- STA=SICR07 --

OBS	STRMNO	TYPE	T1	T2	HYD	STG	FLO	SAMNO	CNT	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	TZN	SZN	TPB	SPB
259	264.1	2	22SEP79:01:17	.	1	0.75	13.000	1.7	1	125.0	32.2	0.09	1.55	0.48	0.21	0.12	0.15	0.31	.	.	.	.
260	264.1	2	22SEP79:01:19	.	4	1.00	23.300	2.7	1	163.0	29.2	0.11	1.63	0.60	0.23	0.12	0.16	0.38	.	.	.	.
261	264.1	2	22SEP79:01:21	.	3	1.25	36.500	3.7	1	185.0	17.1	0.11	1.29	0.42	0.23	0.10	0.14	0.37	.	.	.	.
262	264.1	2	22SEP79:01:23	.	6	1.00	23.300	4.7	1	136.0	38.3	0.11	1.75	0.50	0.27	0.13	0.18	0.44	.	.	.	.
263	264.1	2	22SEP79:01:28	.	6	0.75	13.000	5.7	1	99.0	50.4	0.11	1.27	0.58	0.13	0.17	0.20	0.39	.	.	.	.
264	264.1	2	22SEP79:01:35	.	6	0.50	5.570	6.7	1	97.0	29.2	0.19	1.07	0.56	0.18	0.00	0.20	0.36	.	.	.	.
265	264.1	2	22SEP79:01:58	.	2	0.25	1.280	7.7	1	138.0	38.3	0.15	1.01	0.62	0.13	.	0.05	0.13	.	.	.	.
266	274.0	2	01OCT79:16:02	.	1	0.50	5.570	1.5	1	7.0	.	0.07	0.55	0.33	0.61	0.01	0.03	0.05	.	.	.	.
267	274.0	2	01OCT79:16:04	.	4	0.75	13.000	2.5	1	372.0	.	0.21	3.07	0.57	0.33	0.05	0.07	0.76	.	.	.	.
268	274.0	2	01OCT79:16:22	.	3	1.00	23.300	3.5	1	171.0	.	0.21	1.41	0.69	0.20	0.08	0.08	0.30	.	.	.	.
269	274.0	2	01OCT79:16:50	.	6	0.75	13.000	4.5	1	79.0	.	0.33	0.91	0.77	0.26	0.15	0.15	0.23	.	.	.	.
270	274.0	2	01OCT79:17:15	.	2	0.50	5.570	5.5	1	61.0	.	0.19	0.89	0.65	0.26	0.12	0.12	0.22	.	.	.	.
271	274.1	2	01OCT79:17:32	.	1	0.75	13.000	1.6	1	117.0	.	0.27	1.26	0.55	0.26	0.10	0.10	0.24	.	.	.	.
272	274.1	2	01OCT79:17:34	.	5	1.00	23.300	2.6	1	119.0	.	0.15	0.97	0.39	0.16	0.09	0.10	0.23	.	.	.	.
273	274.1	2	01OCT79:17:37	.	3	1.25	36.500	3.6	1	.	.	0.17	0.93	0.39	0.12	0.08	0.10	0.26	.	.	.	.
274	274.1	2	01OCT79:17:40	.	6	1.00	23.300	4.6	1	.	.	0.17	0.91	0.37	0.12	0.09	0.11	0.26	.	.	.	.
275	274.1	2	01OCT79:18:50	.	6	0.50	5.570	5.6	1	.	.	0.17	0.91	0.51	0.20	.	0.07	0.15	.	.	.	.
276	274.1	2	01OCT79:20:14	.	2	0.25	1.280	6.6	1	.	.	0.17	0.83	0.63	0.26	0.11	0.11	0.17	.	.	.	.
277	274.2	2	02OCT79:13:03	.	1	0.25	1.280	1.3	1	18.0	.	0.09	0.75	0.56	0.65	0.04	0.07	0.14	.	.	.	.
278	274.2	2	02OCT79:13:17	.	1	0.50	5.570	2.3	1	65.0	.	0.07	0.65	0.35	0.53	0.04	0.07	0.16	.	.	.	.
279	274.2	2	02OCT79:13:35	.	2	0.25	1.280	3.3	1	30.0	.	0.11	0.67	0.56	0.26	0.07	0.13	0.19	.	.	.	.
280	275.0	2	03OCT79:05:13	.	1	0.50	5.570	1.2	1	21.0	.	0.15	0.88	0.82	0.33	0.09	.	.	.	.	.	.
281	275.0	2	03OCT79:06:10	.	1	0.25	1.280	2.2	1	36.0	.	0.09	0.88	0.60	0.35	0.04	.	.	.	.	.	.
282	278.0	2	05OCT79:22:35	.	1	0.50	5.570	1.2	1	44.0	.	0.15	1.33	0.87	0.37	0.10	0.12	0.26	.	.	.	.
283	278.0	2	05OCT79:23:28	.	2	0.25	1.280	2.2	1	7.0	.	0.11	0.72	0.62	0.33	0.04	0.07	0.08	.	.	.	.
284	18.0	2	18JAN80:07:30	.	1	0.10	0.179	1.6	1	6.0	20.4	0.03	0.31	0.29	0.86	0.00	0.01	0.02	25	15	0	0
285	18.0	2	18JAN80:09:45	.	5	0.18	0.634	2.6	1	25.0	30.0	0.13	0.74	0.54	0.75	0.02	0.04	0.08	55	40	0	0
286	18.0	2	18JAN80:12:50	.	5	0.30	1.890	3.6	1	76.0	47.0	0.13	1.16	0.69	0.65	0.04	0.04	0.19	60	20	160	0
287	18.0	2	18JAN80:13:35	.	5	0.40	3.480	4.6	1	41.0	39.3	0.13	0.96	0.63	0.51	0.09	0.09	0.17	40	20	0	0
288	18.0	2	18JAN80:13:38	.	3	0.50	5.570	5.6	1	67.0	43.1	0.15	0.98	0.76	0.51	0.07	0.07	0.28	65	20	120	0
289	18.0	2	18JAN80:14:45	.	2	0.30	1.890	6.6	1	31.0	31.8	0.15	0.91	0.63	0.51	0.09	0.09	0.16	35	20	0	0
290	18.1	2	18JAN80:15:51	.	1	0.30	1.890	1.6	1	21.0	24.2	0.15	0.77	0.69	0.51	0.09	0.09	0.13	30	20	0	0
291	18.1	2	18JAN80:19:24	.	1	0.50	5.570	2.6	1	21.0	30.0	0.13	0.88	0.58	0.61	0.11	0.11	0.15	30	20	0	0
292	18.1	2	18JAN80:20:20	.	6	0.40	3.480	3.6	1	46.0	35.6	0.15	0.92	0.60	0.51	0.09	0.09	0.19	30	25	0	0
293	18.1	2	18JAN80:21:10	.	6	0.30	1.890	4.6	1	22.0	24.2	0.13	0.83	0.78	0.51	0.09	0.09	0.12	30	20	0	0
294	18.1	2	18JAN80:23:41	.	6	0.20	0.794	5.6	1	20.0	31.8	0.15	1.12	0.72	0.53	0.09	0.09	0.16	30	20	0	0
295	18.1	2	19JAN80:11:30	.	2	0.18	0.634	6.6	1	17.0	24.2	0.15	0.98	0.81	0.74	0.10	0.11	0.15	30	25	0	0
296	53.0	2	22FEB80:01:30	.	1	0.10	0.179	1.5	1	306.0	.	0.28	4.91	0.87	1.78	0.02	0.05	1.08	.	.	.	.
297	53.0	2	22FEB80:03:15	.	1	0.20	0.794	2.5	1	18.5	.	0.07	0.69	0.65	1.16	0.01	0.03	0.07	.	.	.	.
298	53.0	2	22FEB80:03:25	.	4	0.10	0.179	3.5	1	514.0	.	0.36	4.18	0.74	1.78	0.03	0.08	1.06	.	.	.	.
299	53.0	2	22FEB80:03:45	.	3	0.20	0.794	4.5	1	293.0	.	0.17	2.11	0.56	1.60	0.01	0.06	0.47	.	.	.	.
300	53.0	2	22FEB80:05:00	.	2	0.10	0.179	5.5	1	68.0	.	0.26	1.36	0.82	1.42	0.03	0.05	0.15	.	.	.	.
301	88.0	2	28MAR80:13:00	29MAR80:13:01	.	0.15	0.420	6.0	1	53.0	.	0.16	1.07	0.79	0.43	0.04	0.07	0.11	.	.	.	.
302	91.0	2	31MAR80:14:10	31MAR80:17:06	.	0.28	1.480	7.0	1	16.0	.	0.15	0.79	0.64	0.32	0.05	0.06	0.08	.	.	.	.
303	95.0	2	04APR80:02:40	04APR80:09:30	.	0.18	0.660	10.0	1	127.0	.	0.16	1.12	0.51	0.86	0.03	0.03	0.23	.	.	.	.
304	100.0	2	09APR80:03:50	.	1	0.20	0.794	1.7	1	406.0	.	0.10	2.27	0.51	0.25	0.01	0.04	0.51	.	.	.	.
305	100.0	2	09APR80:03:55	.	5	0.30	1.890	2.7	1	386.0	.	0.14	2.03	0.78	0.29	0.02	0.07	0.50	.	.	.	.

APPENDIX A-2

FLOW AND CONCENTRATION DATA COLLECTED DURING RUNOFF EVENTS

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----------------------------------------------------------- STA=51CR07 ------------------------------------------------------------

OBS STRMNO TYPE TI1           TI2           HYD STG  FLO    SAMNO CMT  TSS    COD   NH3   TKN  SKN  NO23 OP   TSP  TP   TZN SZN TPB SPB

306 100.0 2 09APR80:04:06             . 3 0.40 3.4800  3.7 1.0  498.0     .  0.16 2.63 0.55 0.23 0.03 0.06 0.65 . . . .
307 100.0 2 09APR80:04:08             . 6 0.30 1.8900  4.7 1.0  542.0     .  0.18 2.96 0.40 0.23 0.02 0.04 0.70 . . . .
308 100.0 2 09APR80:04:29             . 6 0.20 0.7940  5.7 1.0  153.0     .  0.36 1.87 1.27 0.25 0.08 0.10 0.31 . . . .
309 100.0 2 09APR80:07:40             . 6 0.10 0.1790  6.7 1.0   36.0     .  0.24 1.54 1.09 0.31 0.08 0.08 0.15 . . . .
310 100.0 2 09APR80:09:30             . 2 0.09 0.1430  7.7 1.0   11.5     .  0.24 1.22 1.05 0.35 0.08 0.08 0.13 . . . .
311 105.0 2 14APR80:21:42 15APR80:00:05 . 0.20 0.7500  7.0 1.0 1076.0     .  0.08 5.05 0.79 0.12 0.01 0.06 1.24 . . . .
312 115.0 2 24APR80:17:20 24APR80:18:40 . 0.20 0.7700  6.0 1.0 1060.0     .  1.95    . 2.67 2.00 0.01 0.03 1.61 . . . .
313 118.0 2 27APR80:18:13 27APR80:21:00 . 0.57 7.2600  9.0 1.0  624.0     .  0.60 4.49 0.97 0.50 0.00 0.05 0.96 . . . .
314 118.1 2 27APR80:22:01 28APR80:05:52 . 0.18 0.6300  3.0 1.0   60.0     .  0.36 1.39 0.88 0.76 0.03 0.05 0.17 . . . .
315 119.0 2 28APR80:12:50 28APR80:13:37 . 0.16 0.4900  2.0 1.0   39.0     .  0.32 1.11 0.77 0.72 0.03 0.04 0.18 . . . .
316 119.1 2 28APR80:16:53 28APR80:20:21 . 0.16 0.4900  2.0 1.0   60.0     .  0.23 1.30 0.94 0.33 0.05 0.05 0.16 . . . .
317 139.0 2 18MAY80:00:55 18MAY80:08:50 . 0.18 0.6000  5.0 1.0  126.0     .  0.23 1.71 0.81 0.51 0.04 0.06 0.32 . . . .
318 140.0 2 19MAY80:18:32 19MAY80:19:04 . 0.20 0.7800  5.0 1.0  394.0     .  0.37 2.69 0.85 0.56 0.03 0.03 0.47 . . . .
319 176.0 2 24JUN80:00:24 24JUN80:00:49 . 0.17 0.5400  3.0 1.0  260.0     .  0.57    . 2.67 1.57 0.01 0.08 0.87 . . . .
320 181.0 2 29JUN80:23:11 29JUN80:23:51 . 0.19 0.6700  7.0 1.0  472.0     .  0.25 3.74 1.21 1.11 0.00 0.08 0.82 . . . .
321 185.0 2 03JUL80:06:14 03JUL80:06:52 . 0.54 6.4500 15.0 1.0  259.0     .  0.21 1.67 0.70 0.80 0.00 0.07 0.37 . . . .
322 185.1 2 03JUL80:14:48 03JUL80:15:32 . 0.55 6.7000 17.0 1.0  204.0     .  0.15 1.08 0.53 0.66 0.07 0.10 0.28 . . . .
323 187.0 2 05JUL80:15:51 05JUL80:16:28 . 0.39 3.2100 12.0 1.0  199.0     .  0.07 1.25 0.41 0.60 0.00 0.06 0.26 . . . .
324 190.0 2 08JUL80:08:34             . 1 0.10 0.1790  1.9 1.0      .  28.0  0.10 0.85 0.41 0.45 0.01 0.03 0.06 . . . .
325 190.0 2 08JUL80:08:35             . 5 0.20 0.7940  2.9 1.0      . 204.0  0.28 3.30 1.26 1.87 0.02 0.05 0.57 . . . .
326 190.0 2 08JUL80:08:44             . 5 0.30 1.8900  3.9 1.0      . 100.0  0.36 1.91 0.83 1.20 0.02 0.05 0.27 . . . .
327 190.0 2 08JUL80:08:45             . 3 0.40 3.4800  4.9 1.0      .  92.0  0.22    .    . 1.20 0.01    .    . . . . .
328 190.0 2 08JUL80:08:52             . 6 0.30 1.8900  5.9 1.0      .  72.0  0.38 1.37 0.96 0.93 0.02 0.05 0.18 . . . .
329 190.0 2 08JUL80:08:59             . 4 0.20 0.7940  6.9 1.0      .  52.0  0.30 1.30 0.73 0.77 0.01 0.03 0.14 . . . .
330 190.0 2 08JUL80:09:38             . 5 0.30 1.8900  7.9 1.0      .  52.0  0.18 0.88 0.55 0.61 0.01 0.05 0.13 . . . .
331 190.0 2 08JUL80:10:21             . 6 0.20 0.7940  8.9 1.0      .  24.0  0.12 0.53 0.47 0.43 0.02 0.04 0.08 . . . .
332 190.0 2 08JUL80:10:51             . 2 0.10 0.1790  9.9 1.0      .  12.0  0.14 0.59 0.51 0.51 0.03 0.05 0.08 . . . .
333 190.1 2 08JUL80:15:26 09JUL80:16:37 . 0.29 1.7400 17.0 1.0  163.0     .  0.32 1.29 0.75 0.79 0.05 0.07 0.23 . . . .
334 203.0 2 21JUL80:21:15 21JUL80:21:47 . 0.65 9.7500 10.0 1.0  209.0     .  0.10 1.25 0.36 0.49 0.02 0.05 0.31 . . . .
335 203.1 2 21JUL80:23:32 22JUL80:00:01 . 0.35 2.6400  9.0 1.0  384.0     .  0.10 2.13 0.40 0.67    . 0.07 0.31 . . . .
336 204.0 2 22JUL80:19:26 22JUL80:21:03 . 0.49 5.2300 13.0 1.0  247.0  36.2  0.08 0.85 0.33 0.42    . 0.05 0.21 . . . .
337 204.1 2 22JUL80:22:50 23JUL80:01:29 . 0.25 1.2700  5.0 1.0  424.0  46.6  0.14 0.89 0.41 0.50    . 0.07 0.26 . . . .
338 211.0 2 29JUL80:02:06 29JUL80:02:57 . 0.16 0.4900  3.0 1.0   66.0  60.8  0.06 0.93 0.43 0.61 0.01 0.03 0.11 . . . .
339 214.0 2 01AUG80:14:06 01AUG80:14:45 . 0.18 0.6000  5.0 1.0  116.0     .  0.26 2.04 1.25 1.43 0.03 0.05 0.26 . . . .
340 216.0 2 03AUG80:16:06 03AUG80:16:35 . 0.21 0.8400  7.0 1.0  120.0     .  0.38 1.74 1.15 0.77 0.04 0.07 0.27 . . . .
341 216.1 2 03AUG80:23:47 04AUG80:01:37 . 0.23 1.0700 10.0 1.0  144.0  74.2  0.18 1.60 0.67 0.77 0.01 0.04 0.22 . . . .
342 231.0 2 18AUG80:05:52 18AUG80:09:25 . 0.23 1.0500  9.0 1.0  825.0 140.0  0.12 3.51 0.51 0.68 0.02 0.06 0.94 . . . .
343 232.0 2 19AUG80:02:57 19AUG80:03:54 . 0.20 0.8000  5.0 1.0   99.0  33.2  0.05 1.46 0.32 0.58 0.01 0.05 0.14 . . . .
344 254.0 2 10SEP80:01:09 10SEP80:02:24 . 0.13 0.3400 15.0 1.0  294.0 132.0  0.21 2.72 1.10 1.41 0.02 0.05 0.50 . . . .
345 269.0 2 25SEP80:03:55             . 1 0.18 0.0939  1.6 1.0   80.0  70.2  0.18 1.73 0.71 1.40 0.01 0.07 0.36 . . . .
346 269.0 2 25SEP80:05:52             . 3 0.30 0.2340  2.6 1.0  154.0     .  0.16 3.10 0.70 0.91 0.04 0.12 0.72 . . . .
347 269.0 2 25SEP80:07:44             . 3 0.30 0.2340  3.6 1.0   42.0  33.2  0.14 0.86 0.84 0.47 0.03 0.07 0.21 . . . .
348 269.0 2 25SEP80:08:06             . 6 0.22 0.1340  4.6 1.0   20.0  27.6  0.20 0.66 0.54 0.51 0.02 0.06 0.09 . . . .
349 269.0 2 25SEP80:10:55             . 6 0.11 0.0407  5.6 1.0   12.0  27.8  0.14 0.78 0.70 0.73 0.02 0.07 0.10 . . . .
350 269.0 2 25SEP80:12:43             . 2 0.07 0.0186  6.6 1.0   12.0  34.0  0.06 0.33 0.33 0.47 0.01 0.05 0.07 . . . .
351 276.0 2 02OCT80:21:50 03OCT80:04:02 . 0.24 0.1600  5.0 1.0  230.0     . 26.82    .    . 4.06 3.18    .    . . . . .
352 299.0 2 25OCT80:09:00 25OCT80:15:00 . 1.60 7.1100 12.0 1.0  514.0  40.0  0.40 1.24 0.81 0.97 0.21 0.21 0.70 . . . .
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APPENDIX A-2

FLOW AND CONCENTRATION DATA COLLECTED DURING RUNOFF EVENTS

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---------------------------------------------------------------- STA=51CR07 ----------------------------------------------------------------

OBS STRMNO TYPE      T11                 T12 HYD STG   FLO   SAMNO CNT TSS COD NH3   TKN  SKN NO23  OP   TSP  TP  T2N S2N TPR SPR

353  302.0   2   28OCT80:06:20 28OCT80:12:10  .  0.20 0.1100   6.0 1.0  25  22 0.16 0.47 0.43 0.43 0.02 0.03 0.08   .   .   .   .
354  309.0   2   04NOV80:08:13 04NOV80:14:15  .  0.58 0.8200  11.0 2.5  16  28 0.09 1.86 1.39 0.81 0.01 0.11 0.29   .   .   .   .
355  329.0   2   24NOV80:03:18 25NOV80:03:02  .  0.66 1.0200  12.0 1.0  66  64 0.22 1.16 0.97 0.66 0.14 0.14 0.23   .   .   .   .
356  332.0   2   27NOV80:15:56 28NOV80:08:50  .  0.41 0.4200   4.0 1.0  28  12 0.06 0.86 0.64 0.86 0.06 0.05 0.12   .   .   .   .
357   52.0   2   21FEB81:00:10                1  0.40 0.4020   1.5 1.0   .  20 0.05 0.61 0.42 0.88 0.02 0.02 0.07   .   .   .   .
358   52.0   2   21FEB81:00:56                3  0.58 0.8320   2.5 1.0   .  20 0.07 0.67 0.32 0.60 0.02 0.02 0.16   .   .   .   .
359   52.0   2   21FEB81:01:29                6  0.39 0.3830   3.5 1.0   .  24 0.15 0.65 0.24 0.52    . 0.03 0.13   .   .   .   .
360   52.0   2   21FEB81:05:22                6  0.18 0.0939   4.5 1.0   .  16 0.15 0.59 0.30 0.48    . 0.06 0.15   .   .   .   .
361   52.0   2   21FEB81:12:41                2  0.13 0.0538   5.5 1.0   .  16 0.05 0.36 0.36 0.45 0.02 0.02 0.06   .   .   .   .
362   53.0   2   22FEB81:12:08 26FEB81:12:36  .  0.52 0.6600  30.0 1.0 487  58 0.46 1.36 0.49 0.60 0.11    . 0.37   .   .   .   .
363   63.0   2   04MAR81:16:00 06MAR81:09:10  .  0.22 0.1300   5.0 2.2  23   . 0.06 0.56 0.33 1.00 0.02 0.05 0.10   .   .   .   .
364   89.0   2   30MAR81:07:56 31MAR81:11:50  .  0.36 0.2400  16.0 1.0 531 116 0.49 2.82 0.76 0.36 0.17 0.17 0.81   .   .   .   .
365   91.0   2   01APR81:13:19 01APR81:17:15  .  0.49 0.5960   8.0 1.0  96   . 1.07 2.40 1.42 0.79 0.22 0.22 0.43   .   .   .   .
366   99.0   2   09APR81:09:22 09APR81:15:32  .  0.46 0.4830  10.0 1.0  32   . 0.17 0.86 0.67 0.46 0.03 0.06 0.12   .   .   .   .
367  102.0   2   12APR81:17:40 13APR81:06:27  .  0.61 0.8900  15.0 1.0 110   . 0.41 1.66 0.93 0.78 0.05 0.05 0.23   .   .   .   .
368  104.0   2   14APR81:17:06 14APR81:18:56  .  0.47 0.5490   6.0 1.0 240   . 0.11 0.97 0.62 0.55 0.00 0.06 0.66   .   .   .   .
369  107.0   2   17APR81:09:12 17APR81:13:45  .  0.41 0.4200   5.0 1.0  11   . 0.12 0.55 0.53 0.46 0.03 0.03 0.11   .   .   .   .
370  120.0   2   30APR81:09:20 30APR81:12:00  .  0.32 0.2640   3.0 1.0 106   . 0.32 2.33 1.05 0.85 0.01 0.06 0.29   .   .   .   .
371  120.1   2   30APR81:23:03 01MAY81:00:56  .  0.42 0.4410   4.0 1.0  30   . 0.15 0.86 0.49 0.99 0.03 0.05 0.11   .   .   .   .
372  121.0   2   01MAY81:09:36 02MAY81:13:28  .  1.17 3.6000  33.0 2.1 292   . 0.41 2.58 0.86 1.61 0.05 0.05 0.52   .   .   .   .
373  130.0   2   10MAY81:16:26 10MAY81:17:50  .  0.38 0.3650   6.0 1.0  83   . 0.42 1.55 1.06 0.51 0.06 0.06 0.23   .   .   .   .
374  130.1   2   10MAY81:20:15 10MAY81:21:53  .  0.70 1.2200  10.0 1.0 190   . 0.18 1.66 0.59 0.23 0.03 0.05 0.35   .   .   .   .
375  131.0   2   11MAY81:02:08 11MAY81:08:51  .  0.31 0.2340   4.0 1.0  16   . 0.22 0.85 0.76 0.65 0.03 0.06 0.08   .   .   .   .
376  131.1   2   11MAY81:11:02 11MAY81:16:16  .  0.86 1.8800  11.0 1.0  47   . 0.28 1.19 0.76 0.35 0.09 0.10 0.21   .   .   .   .
377  131.2   2   11MAY81:19:51 11MAY81:23:32  .  0.68 1.1400   8.0 1.0 248   . 0.15 1.77 0.56 0.28 0.03 0.06 0.38   .   .   .   .
378  132.0   2   12MAY81:06:47 12MAY81:17:46  .  0.48 0.5720  10.0 1.0  60   . 0.26 1.06 0.89 0.67 0.06 0.07 0.16   .   .   .   .
379  135.0   2   15MAY81:11:50 15MAY81:14:10  .  0.51 0.6640   6.0 1.0 158   . 0.63 2.76 1.20 1.28 0.01 0.05 0.38   .   .   .   .
380  139.0   2   19MAY81:02:57 19MAY81:09:42  .  0.41 0.4200   6.0 1.0  38   . 0.17 0.92 0.56 0.58 0.02 0.06 0.12   .   .   .   .
381  139.1   2   19MAY81:13:15 20MAY81:10:14  .  0.41 0.4200   8.0 1.0  12   . 0.11 0.87 0.62 0.44 0.06 0.10 0.14   .   .   .   .

---------------------------------------------------------------- STA=51CR08 ----------------------------------------------------------------

      S
      T                                               S
      R   T                                           A                                  N
 O    M   Y       T                 T H   S     F     M  C    T     C    N     T    S    O         T       T S T S
 B    N   P       1                 1 Y   T     L     N  N    S     O    H     K    K    2    O    S    T  2 2 P P
 S    O   E       1                 2 D   G     O     O  T    S     D    3     N    N    3    P    P    P  N N R R

382 168.0 2 17JUN79:05:19           . 1 0.20 0.8013 1.40 1 956.0 117.0 0.12  3.53    . 0.36 0.00 0.18 1.10 . . . .
383 168.0 2 17JUN79:05:23           . 5 0.30 1.8790 2.40 1 376.0  86.5 0.12  2.86 1.08 0.45 0.00 0.08 0.57 . . . .
384 168.0 2 17JUN79:05:30           . 3 0.40 3.4110 3.40 1 938.0 155.0 0.06  4.20    . 0.53 0.00 0.18 1.18 . . . .
385 168.0 2 17JUN79:05:43           . 2 0.10 0.1831 4.40 1 106.0  47.8 0.06  1.08    . 0.40 0.00 0.18 0.33 . . . .
386 222.0 2 10AUG79:22:43           . 1 0.10 0.1831 1.30 1 762.0     . 0.22  4.59 0.56 0.19 0.00 0.15 1.20 . . . .
387 222.0 2 10AUG79:22:46           . 3 0.20 0.8013 2.30 1 235.0     . 0.08  1.98    . 0.92 0.00    .    . . . . .
388 222.0 2 11AUG79:00:17           . 2 0.10 0.1831 3.30 1 546.0     . 0.06  1.06 0.92 0.86 0.02 0.09 0.15 . . . .
389 233.0 2 21AUG79:10:33           . 1 0.20 0.8013 1.20 1  78.0     . 0.06  0.88 0.41 0.08 0.01 0.02 0.13 . . . .
390 233.0 2 21AUG79:17:00           . 2 0.10 0.1831 2.20 1   4.0     . 0.08  0.63 0.43 0.26 0.01 0.01 0.03 . . . .
391 236.0 2 24AUG79:21:15           . 1 0.05 0.0413 1.40 1 331.0     . 0.12  2.28 0.66 0.12 0.00 0.08 0.51 . . . .
392 236.0 2 24AUG79:21:33           . 5 0.10 0.1831 2.40 1 692.0     . 0.26  4.23 0.85 0.18 0.00 0.11 1.81 . . . .
393 236.0 2 24AUG79:21:40           . 3 0.15 0.4352 3.40 1     .     . 0.26 12.86 1.25 0.32 0.01 0.11 3.07 . . . .
```

APPENDIX A-2

FLOW AND CONCENTRATION DATA COLLECTED DURING RUNOFF EVENTS

STA=SICHOR

OBS	STRMNO	TYPE	TI1	TI2	HYD	SIG	FLO	SAMNO	CMT	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	TZN	SZN	TPB	SPB
394	236.0	2	25AUG79:11:55	.	2	0.05	0.0413	4.40	1	68.0	.	0.11	1.77	1.05	0.52	0.02	0.11	0.26	.	.	.	.
395	237.0	2	25AUG79:20:04	.	1	0.10	0.1831	1.11	1	3.5	.	0.12	0.47	0.47	0.09	0.00	0.02	0.03	.	.	.	.
396	237.0	2	25AUG79:20:32	.	5	0.15	0.4352	2.11	1	2.0	.	0.16	0.63	0.49	0.11	0.00	0.02	0.03	.	.	.	.
397	237.0	2	25AUG79:20:35	.	3	0.20	0.8013	3.11	1	2.5	.	0.16	0.45	0.45	0.11	0.00	0.02	0.03	.	.	.	.
398	237.0	2	25AUG79:20:42	.	6	0.15	0.4352	4.11	1	3.5	.	0.16	0.51	0.47	0.11	0.00	0.02	0.03	.	.	.	.
399	237.0	2	25AUG79:20:47	.	4	0.10	0.1831	5.11	1	2.0	.	0.16	0.53	0.43	0.11	0.00	0.02	0.03	.	.	.	.
400	237.0	2	25AUG79:20:57	.	5	0.15	0.4352	6.11	1	2.0	.	0.20	0.57	0.39	0.14	0.00	0.03	0.03	.	.	.	.
401	237.0	2	25AUG79:21:14	.	3	0.20	0.8013	7.11	1	2.0	.	0.12	0.51	0.45	0.13	0.00	0.03	0.04	.	.	.	.
402	237.0	2	25AUG79:22:20	.	4	0.15	0.4352	8.11	1	3.0	.	.	.	.	.	.	.	.	.	.	.	.
403	237.0	2	26AUG79:02:19	.	3	0.20	0.8013	9.11	1	10.5	.	0.08	0.57	.	0.13	0.00	0.04	0.05	.	.	.	.
404	237.0	2	26AUG79:10:30	.	6	0.15	0.4352	10.11	1	1.5	.	.	.	.	.	.	.	.	.	.	.	.
405	237.0	2	26AUG79:14:18	.	2	0.10	0.1831	11.11	1	1.5	.	0.26	1.66	0.51	0.14	0.00	0.03	0.20	.	.	.	.
406	105.0	2	14APR80:12:05	.	1	0.50	0.5640	1.70	1	109.0	159.0	0.38	1.54	1.00	0.80	0.02	0.05	0.16	.	.	.	.
407	105.0	2	14APR80:12:33	.	5	0.75	1.3000	2.70	1	65.0	147.0	0.36	1.29	0.98	0.74	0.02	0.05	0.12	.	.	.	.
408	105.0	2	14APR80:13:42	.	3	1.00	2.4100	3.70	1	93.0	127.0	0.32	1.36	0.94	0.49	0.01	0.05	0.16	.	.	.	.
409	105.0	2	14APR80:14:15	.	3	1.00	2.4100	4.70	1	49.0	120.0	0.30	1.18	0.96	0.43	0.01	0.06	0.12	.	.	.	.
410	105.0	2	14APR80:14:31	.	6	0.75	1.3000	5.70	1	42.0	120.0	0.28	1.29	1.05	0.45	0.01	0.07	0.13	.	.	.	.
411	105.0	2	14APR80:15:02	.	6	0.50	0.5640	6.70	1	36.0	116.0	0.28	1.16	0.89	0.45	0.01	0.06	0.12	.	.	.	.
412	105.0	2	14APR80:15:50	.	2	0.25	0.1486	7.70	1	34.0	139.0	0.27	1.14	0.92	0.52	0.01	0.05	0.10	.	.	.	.
413	115.0	2	24APR80:17:30	24APR80:19:35	.	1.05	2.7100	8.00	1	528.0	.	1.20	5.83	2.10	1.86	0.01	0.05	0.84	.	.	.	.
414	118.0	2	27APR80:02:13	27APR80:03:31	.	0.69	1.0900	2.00	1	54.0	.	0.46	1.20	0.96	0.88	0.01	0.02	0.10	.	.	.	.
415	118.1	2	27APR80:18:23	27APR80:21:27	.	1.50	6.0000	8.00	1	153.0	.	0.44	1.83	0.81	0.86	0.01	0.03	0.26	.	.	.	.
416	118.2	2	27APR80:22:56	28APR80:07:00	.	0.69	1.0900	3.00	1	432.0	.	0.46	2.66	0.75	0.52	0.00	0.03	0.66	.	.	.	.
417	119.0	2	28APR80:12:22	28APR80:23:33	.	0.92	2.0400	6.00	1	65.0	.	0.28	1.16	0.93	0.42	0.02	0.06	0.10	.	.	.	.
418	120.0	2	29APR80:15:00	30APR80:09:12	.	0.47	0.5000	5.00	1	35.0	.	0.29	1.05	0.86	0.59	0.01	0.03	0.08	.	.	.	.
419	160.0	2	19MAY80:16:46	19MAY80:21:54	.	0.72	1.2100	9.00	1	198.0	.	0.25	2.01	0.66	0.48	0.02	0.02	0.33	.	.	.	.
420	167.0	2	15JUN80:17:03	15JUN80:21:36	.	1.16	3.3000	13.00	1	493.0	.	0.28	3.58	0.66	0.62	0.04	0.06	1.12	.	.	.	.
421	168.0	2	16JUN80:06:32	16JUN80:08:42	.	0.62	0.8800	3.00	1	214.0	.	0.20	1.47	0.62	0.32	0.03	0.06	0.31	.	.	.	.
422	168.1	2	16JUN80:09:00	16JUN80:15:16	.	0.55	0.6900	3.00	1	30.0	.	0.16	0.68	0.52	0.20	0.02	0.03	0.08	.	.	.	.
423	176.0	2	24JUN80:00:44	26JUN80:02:21	.	0.53	0.6600	3.00	1	332.0	.	0.26	4.83	1.25	0.58	0.00	0.09	1.25	.	.	.	.
424	181.0	2	29JUN80:19:46	29JUN80:21:12	.	0.82	1.5600	5.00	1	260.0	.	0.19	2.22	0.83	0.99	0.00	0.07	0.59	.	.	.	.
425	185.1	2	03JUL80:14:50	03JUL80:23:45	.	1.02	2.5000	13.00	1	261.0	.	0.11	1.25	0.49	0.68	0.02	0.06	0.33	.	.	.	.
426	190.0	2	08JUL80:08:10	.	1	0.57	0.7360	1.70	1	166.0	37.6	0.08	0.99	0.43	0.43	0.02	0.04	0.23	.	.	.	.
427	190.0	2	08JUL80:08:12	.	5	0.82	1.5700	2.70	1	332.0	.	0.08	1.85	0.41	0.61	0.02	0.05	0.42	.	.	.	.
428	190.0	2	08JUL80:08:14	.	5	1.07	2.7900	3.70	1	362.0	.	0.18	1.63	0.53	0.79	0.03	0.06	0.43	.	.	.	.
429	190.0	2	08JUL80:08:22	.	3	1.32	4.4400	4.70	1	252.0	.	0.20	2.06	0.51	0.83	0.03	0.06	0.44	.	.	.	.
430	190.0	2	08JUL80:10:50	.	6	1.07	2.7900	5.70	1	142.0	.	0.24	1.05	0.68	0.87	0.00	0.09	0.24	.	.	.	.
431	190.0	2	08JUL80:12:41	.	6	0.82	1.5700	6.70	1	122.0	.	0.24	1.05	0.64	0.87	0.09	0.09	0.23	.	.	.	.
432	190.0	2	08JUL80:13:42	.	2	0.57	0.7360	7.70	1	159.0	.	0.30	0.97	0.74	0.89	.	0.09	0.23	.	.	.	.
433	190.1	2	08JUL80:15:20	09JUL80:19:10	.	1.01	2.4700	10.00	1	194.0	.	0.18	1.41	0.57	0.63	0.02	0.05	0.39	.	.	.	.
434	214.0	2	01AUG80:14:30	02AUG80:17:43	.	0.79	1.4400	7.00	1	86.0	45.8	0.12	1.09	0.63	0.88	.	0.03	0.15	.	.	.	.
435	229.0	2	16AUG80:02:49	16AUG80:09:45	.	0.12	0.0400	3.00	1	3209.0	28.4	0.14	0.93	0.59	0.47	0.01	0.06	0.13	.	.	.	.
436	231.1	2	18AUG80:06:12	18AUG80:09:28	.	0.39	0.3500	5.00	1	132.0	212.0	0.28	7.88	0.56	0.35	0.03	0.19	1.18	.	.	.	.
437	232.0	2	19AUG80:07:31	19AUG80:11:43	.	0.35	0.2800	12.00	1	508.0	41.6	0.11	1.12	0.22	0.35	0.04	0.05	0.28	.	.	.	.
438	269.0	2	25SEP80:05:32	.	1	0.12	0.0406	1.40	1	478.0	64.4	0.44	.	.	1.66	0.05	.	.	.	.	.	.
439	269.0	2	25SEP80:06:32	.	3	0.22	0.1176	2.40	1	658.0	.	0.38	.	.	1.88	0.06	.	.	.	.	.	.
440	269.0	2	25SEP80:10:05	.	6	0.12	0.0406	3.40	1	100.0	28.8	0.18	0.71	0.71	0.71	0.03	.	0.12	.	.	.	.

APPENDIX A-2

FLOW AND CONCENTRATION DATA COLLECTED DURING RUNOFF EVENTS

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--------------------------------------------------------------- STA=51CR08 ----------------------------------------------------------------
IRS STRMNO TYPE        TI1              TI2     HYD  STG    FLO    SAMNO CMT TSS  COD   NH3   TKN   SKN   NO23  OP    TSP   TP   TZN SZN TPB SPB

 41 269.0   2    25SEP80:13:08                .   2  0.06 0.0121   4.4   1    32  28.0  0.12   .     .    0.71  0.01   .     .    .   .   .   .
 42 285.0   2    11OCT80:15:39  11OCT80:17:10 .   .  0.99 2.3600   5.0   1    47  67.8  0.42  2.37  1.81  2.56  0.03  0.06  0.16  .   .   .   .
 43 299.0   2    25OCT80:08:15  25OCT80:15:15 .   .  1.53 6.2000  11.0   1   186  22.0  0.43  1.05  0.69  0.94  0.27   .    0.43  .   .   .   .
 44 309.0   2    04NOV80:08:27  04NOV80:14:30 .   .  0.39 0.3400   6.0   1   159  16.0  0.00  1.10  0.70  0.69  0.02  0.07  0.24  .   .   .   .
 45 322.0   2    17NOV80:15:41  18NOV80:02:22 .   .  0.64 0.9200   8.0   1   117  28.0  0.23   .     .    0.50  0.15   .     .    .   .   .   .
 46 332.0   2    27NOV80:16:20  28NOV80:05:05 .   .  0.47 0.4900   5.0   1    27   4.0  0.06  0.90  0.86  0.50  0.04  0.04  0.09  .   .   .   .
 47 337.0   2    02DEC80:19:44                .   1  0.23 0.1275   1.3   1    74  16.0  0.11   .     .    0.27  0.03   .     .    .   .   .   .
 48 337.0   2    02DEC80:20:04                .   3  0.38 0.3280   2.3   1    74  44.0  0.15   .     .    1.17  0.03   .     .    .   .   .   .
 49 337.0   2    02DEC80:21:12                .   2  0.23 0.1275   3.3   1    27  36.0  0.19   .     .    1.44  0.04   .     .    .   .   .   .
 50 344.0   2    09DEC80:10:05  09DEC80:15:55 .   .  0.38 0.3200   4.0   1    48  74.0  0.04  0.59  0.51  0.34  0.07  0.04  0.10  .   .   .   .
 51  39.0   2    08FEB81:10:21  08FEB81:16:19 .   .  0.36 0.3000   3.0   1    59  30.2  0.16  0.87  0.68  0.62  0.04  0.04  0.12  .   .   .   .
 52  50.0   2    19FEB81:23:00                .   1  0.50 0.5640   1.1   1   290  76.0  0.20  1.85  1.26  0.68  0.06  0.06  0.24  .   .   .   .
 53  50.0   2    20FEB81:00:00                .   5  0.55 0.6840   2.1   1    62  32.0  0.24  0.57  0.48  0.60  0.12   .    0.13  .   .   .   .
 54  50.0   2    20FEB81:00:25                .   5  0.90 1.9200   3.1   1   326  52.0  0.26  1.16  0.46   .    0.12   .    0.24  .   .   .   .
 55  50.0   2    20FEB81:00:40                .   3  1.10 2.9700   4.1   1   448  48.0  0.38  1.03   .    0.32  0.13   .    0.35  .   .   .   .
 56  50.0   2    20FEB81:01:30                .   6  0.90 1.9200   5.1   1   254  20.0  0.34  0.90  0.90  0.48  0.20   .    0.28  .   .   .   .
 57  50.0   2    20FEB81:02:30                .   6  0.55 0.6840   6.1   1    80   8.0  0.40  1.05  0.78  0.68  0.23  0.30  0.87  .   .   .   .
 58  50.0   2    20FEB81:03:00                .   6  0.45 0.4570   7.1   1    38  12.0  0.34  0.51  0.47  0.75  0.28   .    0.20  .   .   .   .
 59  50.0   2    20FEB81:03:50                .   6  0.40 0.3630   8.1   1    20   8.0  0.30  0.38  0.36  0.81  0.13   .    0.16  .   .   .   .
 60  50.0   2    20FEB81:05:00                .   6  0.30 0.2090   9.1   1    14  12.0  0.28  0.49  0.40  0.81  0.08   .    0.11  .   .   .   .
 61  50.0   2    20FEB81:06:00                .   2  0.25 0.1486  10.1   1   240    .   0.16  0.47  0.47  0.79  0.06  0.06  0.09  .   .   .   .
 62  51.0   2    20FEB81:09:47  20FEB81:14:44 .   .  0.33 0.2500   4.0   1    34  20.0  0.14  0.41  0.41  0.76  0.02  0.02  0.05  .   .   .   .
 63  52.0   2    21FEB81:00:30  21FEB81:12:09 .   .  0.36 0.3000   4.0   1    48  24.0  0.12  0.41  0.41  0.76  0.03  0.03  0.07  .   .   .   .
 64  53.1   2    23FEB81:09:10  24FEB81:11:41 .   .  0.75 1.3000  12.0   2   384  54.0  0.46  1.25  0.49  0.73  0.13   .    0.29  .   .   .   .
 65  89.0   2    30MAR81:08:13  30MAR81:17:59 .   .  0.47 0.4900  12.0   1   563  78.0  0.52  2.11  0.93  0.57  0.11   .    0.70  .   .   .   .
 66  91.0   2    01APR81:13:40  01APR81:16:17 .   .  0.45 0.4570   4.0   1   351    .   0.13  1.31  0.42  0.47  0.05  0.05  0.31  .   .   .   .
 67  95.0   2    05APR81:13:29  06APR81:04:03 .   .  0.46 0.4780   9.0   1   332    .   0.15  1.51  0.47  0.35  0.05  0.05  0.36  .   .   .   .
 68  99.0   2    09APR81:09:43  09APR81:17:05 .   .  0.50 0.5640   6.0   1    71    .   0.11  0.99  0.52  0.37  0.01  0.03  0.18  .   .   .   .
 69 102.0   2    12APR81:18:13  13APR81:09:12 .   .  0.67 1.0270  12.0   1    88    .   0.34  1.24  0.74  0.65  0.07  0.07  0.28  .   .   .   .
 70 104.0   2    14APR81:17:42  14APR81:22:55 .   .  0.31 0.2220   4.0   1   150    .   0.07  1.09  0.48  0.29  0.02  0.03  0.19  .   .   .   .
 71 107.0   2    17APR81:10:07  17APR81:19:11 .   .  0.30 0.2090   4.0   1    25    .   0.12  0.53  0.38  0.44  0.02  0.04  0.07  .   .   .   .
 72 113.0   2    23APR81:21:11  24APR81:07:33 .   .  0.70 1.1300  12.0   1   466    .    .    2.91  0.93   .     .    0.05  0.60  .   .   .   .
 73 117.0   2    27APR81:03:32  27APR81:13:10 .   .  0.34 0.2650   3.0   1    44    .   0.17   .     .     .    0.01   .     .    .   .   .   .
 74 121.0   2    01MAY81:10:56  02MAY81:13:14 .   .  0.71 1.1600   7.0   1   410    .   0.34  2.24  0.82  0.93  0.12  0.12  0.60  .   .   .   .
 75 131.1   2    11MAY81:11:25  11MAY81:16:32 .   .  1.02 2.5400   5.0   1    93    .   0.22  1.21  0.55  0.29  0.04  0.05  0.21  .   .   .   .
 76 134.0   2    15MAY81:12:05  16MAY81:09:31 .   .  0.32 0.2360   5.0   1   104    .   0.25  1.50  0.82  0.68  0.07  0.07  0.18  .   .   .   .
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APPENDIX A-2

FLOW AND CONCENTRATION DATA COLLECTED DURING RUNOFF EVENTS

STA=51CR09

OBS	STRMNO	TYPE	T1	T2	HYD	STG	FLO	SAMNO	CMT	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	TZN	SZN	TPB	SPB
477	181	2	30JUN79:16:14	30JUN79:17:56	.	0.25	0.1300	3.0	1.0	486.0	.	0.04	2.42	.	0.18	0.00	0.07	0.73	.	.	.	.
478	248	2	05SEP79:14:17	.	1	0.60	0.7450	1.3	1.0	1180.0	56.5	0.06	1.41	0.17	0.22	0.02	0.04	0.26	.	.	.	.
479	248	2	05SEP79:20:20	.	3	2.00	10.9800	2.3	1.0	140.0	50.6	0.30	4.91	0.77	0.18	0.08	0.08	1.58	.	.	.	.
480	248	2	06SEP79:01:10	.	2	1.22	3.5100	3.3	1.0	34.0	32.2	0.12	0.59	0.47	0.15	0.03	0.04	0.16	.	.	.	.
481	264	2	21SEP79:17:20	22SEP79:00:03	.	1.15	3.0900	7.0	2.2	226.0	50.4	0.12	1.83	0.51	0.15	.	0.07	0.49	.	.	.	.
482	274	2	01OCT79:02:22	01OCT79:07:55	.	0.84	1.5300	4.0	1.0	18.8	.	0.03	0.20	0.12	0.07	0.01	0.02	0.04	.	.	.	.
483	18	2	18JAN80:13:38	.	1	0.50	0.5090	1.4	1.0	194.0	44.3	0.00	1.16	0.48	0.15	0.02	0.04	0.29	15	0	0	0
484	18	2	18JAN80:15:23	.	5	0.60	0.7450	2.4	1.0	194.0	59.4	0.01	1.28	0.83	0.16	0.04	0.05	0.30	10	0	0	0
485	18	2	18JAN80:21:20	.	3	0.70	1.0300	3.4	1.0	60.0	21.6	0.03	0.77	0.50	0.20	0.02	0.04	0.13	0	0	0	0
486	18	2	19JAN80:05:08	.	2	0.60	0.7450	4.4	1.0	37.0	6.5	0.03	0.79	0.77	0.22	0.02	0.03	0.11	0	0	0	0
487	81	2	21MAR80:10:40	21MAR80:13:17	.	1.21	3.4700	4.0	2.1	121.0	.	0.14	0.43	0.20	0.27	0.06	0.06	0.13	.	.	.	.
488	88	2	28MAR80:11:45	29MAR80:15:55	.	0.52	0.5600	4.0	1.0	35.0	.	0.06	0.48	0.40	0.15	0.00	0.06	0.09	.	.	.	.
489	91	2	31MAR80:01:00	31MAR80:09:30	.	0.56	0.6300	3.0	1.0	44.0	.	0.08	0.60	0.34	0.13	0.01	0.05	0.08	.	.	.	.
490	100	2	09APR80:04:30	.	1	0.63	0.8260	1.2	1.0	74.0	23.5	0.06	0.65	0.23	0.07	0.01	0.04	0.15	.	.	.	.
491	100	2	09APR80:14:45	.	2	0.50	0.5090	2.2	1.0	17.0	8.0	0.04	0.27	0.23	0.09	0.01	0.03	0.07	.	.	.	.
492	105	2	14APR80:11:30	14APR80:23:28	.	0.50	0.5000	4.0	1.0	75.0	.	0.20	0.54	0.31	0.27	0.02	0.02	0.10	.	.	.	.
493	140	2	19MAY80:12:30	20MAY80:02:30	.	0.33	0.2100	3.0	1.0	38.0	.	1.05	3.19	2.10	0.40	0.07	0.08	0.25	.	.	.	.
494	141	2	20MAY80:22:03	21MAY80:11:49	.	0.72	1.0900	5.0	1.0	171.0	.	0.09	0.85	0.21	0.17	0.02	0.02	0.21	.	.	.	.
495	155	2	03JUN80:16:12	03JUN80:23:35	.	0.37	0.2800	6.0	1.0	935.0	.	0.11	4.52	0.52	0.13	0.02	0.05	1.28	.	.	.	.
496	190	2	08JUL80:15:31	.	1	0.29	0.1714	1.3	1.0	36.0	24.0	0.07	0.53	0.13	0.11	.	0.03	0.16	.	.	.	.
497	190	2	08JUL80:17:30	.	3	0.30	0.1830	2.3	1.0	115.0	8.0	0.03	0.31	0.22	0.17	0.02	0.04	0.08	.	.	.	.
498	190	2	09JUL80:14:30	.	2	0.12	0.0361	3.3	1.0	159.0	8.0	0.01	0.24	0.11	0.09	0.01	0.02	0.07	.	.	.	.
499	204	2	22JUL80:16:57	.	1	0.24	0.1195	1.4	1.0	968.0	174.0	0.04	3.71	0.48	0.18	0.02	0.06	1.33	.	.	.	.
500	204	2	22JUL80:17:01	.	3	0.34	0.2340	2.4	1.0	1000.0	158.0	0.04	3.87	0.52	0.20	0.02	0.07	1.40	.	.	.	.
501	204	2	22JUL80:17:31	.	6	0.24	0.1195	3.4	1.0	370.0	74.0	0.08	1.56	0.40	0.22	0.03	0.07	0.58	.	.	.	.
502	204	2	22JUL80:19:36	.	2	0.14	0.0447	4.4	1.0	126.0	26.0	0.04	0.66	0.26	0.16	0.02	0.06	0.22	.	.	.	.
503	329	2	24NOV80:10:13	25NOV80:11:43	.	0.15	0.0500	5.0	1.0	10.0	.	0.02	0.45	0.30	0.12	0.01	0.06	0.06	.	.	.	.
504	33	2	02FEB81:07:45	.	1	0.06	0.0100	1.3	4.0	36.0	31.7	0.04	0.87	0.44	0.68	0.02	0.05	0.10	.	.	.	.
505	33	2	02FEB81:10:03	.	5	0.12	0.0341	2.3	4.0	26.0	29.5	0.04	0.66	0.44	0.43	0.02	0.04	0.09	.	.	.	.
506	33	2	02FEB81:11:55	.	2	0.13	0.0366	3.3	4.0	42.0	27.3	0.08	0.72	0.57	0.65	0.03	0.05	0.09	.	.	.	.
507	42	2	11FEB81:03:07	.	1	0.06	0.0100	1.7	1.0	882.0	158.0	0.16	3.39	0.62	0.36	0.02	0.12	0.64	.	.	.	.
508	42	2	11FEB81:03:42	.	5	0.11	0.0293	2.7	1.0	66.0	42.0	0.06	0.83	0.48	0.36	0.02	0.08	0.18	.	.	.	.
509	42	2	11FEB81:04:02	.	5	0.17	0.0632	3.7	1.0	63.0	20.0	0.04	0.87	0.54	0.34	0.03	0.07	0.17	.	.	.	.
510	42	2	11FEB81:05:12	.	5	0.22	0.0930	4.7	1.0	228.0	66.0	0.06	1.61	0.50	0.36	0.02	0.08	0.37	.	.	.	.
511	42	2	11FEB81:05:41	.	3	0.29	0.1714	5.7	1.0	94.0	54.0	0.06	1.41	0.41	0.46	0.02	0.08	0.29	.	.	.	.
512	42	2	11FEB81:09:35	.	6	0.26	0.1390	6.7	1.0	11.0	22.0	0.10	0.61	0.43	0.46	0.02	0.07	0.10	.	.	.	.
513	42	2	11FEB81:15:50	.	2	0.20	0.0850	7.7	1.0	5.0	26.0	0.14	0.57	0.54	0.50	0.02	0.07	0.09	.	.	.	.
514	58	2	19FEB81:22:23	21FEB81:12:55	.	0.23	0.1100	8.0	1.0	12.0	.	0.14	0.36	0.31	0.32	0.02	0.02	0.05	.	.	.	.
515	54	2	23FEB81:02:43	24FEB81:14:25	.	0.28	0.1600	3.0	1.0	9.0	.	0.02	0.28	0.23	0.25	0.02	0.04	0.06	.	.	.	.
516	121	2	01MAY81:11:23	02MAY81:10:30	.	0.12	0.0341	4.0	1.0	6.0	.	0.04	0.46	0.46	0.05	0.01	0.03	0.05	.	.	.	.

APPENDIX A-2

FLOW AND CONCENTRATION DATA COLLECTED DURING RUNOFF EVENTS

STA=SICR10

OBS	STRMNO	TYPE	TI	TI2	HYD	SIG	FLO	SAMNO	CMT	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	TZN	SZN	TPB	SPB
517	233.0	2	21AUG79:01:50	21AUG79:02:18	.	0.13	0.0400	5.0	1.0	1188	.	0.38	6.75	1.38	2.35	0.19	0.20	1.78	.	.	.	.
518	235.0	2	23AUG79:14:22	.	1	0.05	0.0073	1.3	1.0	848	125.0	0.20	4.90	0.84	6.15	.	0.12	1.66	.	.	.	.
519	235.0	2	23AUG79:14:26	.	3	0.10	0.0248	2.3	1.0	1030	50.5	0.24	4.49	0.74	5.36	0.18	0.19	1.82	.	.	.	.
520	235.0	2	23AUG79:14:29	.	2	0.05	0.0073	3.3	1.0	1010	143.0	0.20	3.88	0.66	3.70	0.19	0.19	1.69	.	.	.	.
521	248.0	2	05SEP79:13:43	.	1	0.18	0.7018	1.3	1.0	179	38.3	0.16	2.00	0.81	1.49	0.23	0.27	0.60	.	.	.	.
522	248.0	2	05SEP79:14:55	.	2	0.70	1.0300	2.3	1.0	14	41.3	0.10	1.24	1.11	1.96	0.20	0.23	0.27	.	.	.	.
523	248.0	2	05SEP79:20:55	.	1	0.70	1.0300	3.3	1.0	55	41.3	0.14	1.75	1.07	2.18	0.23	0.27	0.43	.	.	.	.
524	274.1	3	01OCT79:13:25	01OCT79:16:13	.	0.40	0.3200	2.0	1.0	58	.	0.11	1.50	1.07	1.83	0.18	.	.	.	.	.	.
525	275.0	2	02OCT79:22:50	03OCT79:02:50	.	0.40	0.3200	3.0	1.0	238	.	0.17	2.25	1.19	0.88	0.18	0.18	0.59	.	.	.	.
526	278.0	2	05OCT79:08:46	05OCT79:15:10	.	0.63	0.8300	4.0	1.0	149	.	0.21	2.17	1.19	1.13	0.24	.	.	.	.	.	.
527	282.0	2	09OCT79:00:58	09OCT79:05:23	.	0.40	0.3200	3.0	1.0	68	.	0.15	1.52	0.90	1.37	0.22	0.22	0.38	.	.	.	.
528	283.0	2	10OCT79:00:17	11OCT79:09:30	.	0.47	0.4400	6.0	1.0	34	.	0.15	1.12	0.81	1.24	0.15	0.18	0.25	.	.	.	.
529	12.0	2	12JAN80:00:15	.	1	0.10	0.0248	1.3	1.0	9	1358.0	0.22	1.54	1.41	9.44	0.16	0.17	0.21	20	15	0	0
530	12.0	2	12JAN80:03:50	.	3	0.20	0.0850	2.3	1.0	11	699.0	0.28	1.68	1.51	8.47	0.15	0.19	0.24	20	15	0	0
531	12.0	2	12JAN80:05:53	.	2	0.10	0.0248	3.3	1.0	66	578.0	1.77	3.48	2.96	7.12	0.49	0.76	1.38	35	20	0	0
532	14.0	2	14JAN80:14:50	15JAN80:02:13	.	0.21	0.0900	3.0	1.0	168	.	0.28	4.71	3.20	6.27	0.21	0.39	1.00	.	.	.	.
533	18.0	2	18JAN80:10:05	18JAN80:23:11	.	0.41	0.3400	8.0	1.0	304	.	0.20	2.61	1.44	3.72	0.20	0.20	0.70	.	.	.	.
534	81.0	2	21MAR80:11:15	21MAR80:21:05	.	0.41	0.3300	7.0	2.1	1830	.	0.28	5.52	0.68	6.33	0.16	0.20	1.71	.	.	.	.
535	91.0	2	31MAR80:12:07	31MAR80:18:42	.	0.18	0.0700	3.0	1.0	272	.	0.21	2.66	1.21	3.60	0.16	.	0.52	.	.	.	.
536	122.0	2	01MAY80:01:40	.	1	0.06	0.0100	1.3	1.0	364	.	0.16	2.66	1.37	1.68	0.09	0.20	0.66	.	.	.	.
537	122.0	2	01MAY80:03:10	.	3	0.14	0.0447	2.3	1.0	41	.	0.11	1.28	0.94	1.15	0.05	0.10	0.18	.	.	.	.
538	122.0	2	01MAY80:13:00	.	2	0.07	0.0014	3.3	1.0	33	.	0.13	1.46	0.99	0.91	0.06	0.10	0.31	.	.	.	.
539	155.0	2	03JUN80:16:15	03JUN80:16:59	.	0.31	0.1900	6.0	1.0	498	.	3.80	32.30	4.32	20.56	0.06	0.10	0.75	.	.	.	.
540	51.0	2	20FEB81:12:50	.	1	0.09	0.0205	1.9	1.0	536	124.0	0.27	5.04	1.39	20.78	0.12	0.15	1.38	.	.	.	.
541	51.0	2	20FEB81:13:25	.	2	0.15	0.0505	2.9	1.0	344	80.0	0.53	2.59	1.56	21.79	0.16	0.16	0.76	.	.	.	.
542	51.0	2	20FEB81:14:20	.	5	0.20	0.0850	3.9	1.0	272	72.0	0.29	2.51	1.62	20.58	0.14	0.14	0.62	.	.	.	.
543	51.0	2	20FEB81:15:00	.	3	0.23	0.1103	4.9	1.0	366	80.0	0.37	2.89	1.47	20.78	0.15	0.16	0.78	.	.	.	.
544	51.0	2	20FEB81:15:25	.	6	0.20	0.0850	5.9	1.0	196	36.0	0.39	2.91	1.94	20.78	0.15	0.16	0.68	.	.	.	.
545	51.0	2	20FEB81:16:10	.	6	0.16	0.0567	6.9	1.0	118	49.0	0.23	2.45	1.51	20.58	0.13	0.16	0.40	.	.	.	.
546	51.0	2	20FEB81:17:20	.	6	0.11	0.0293	7.9	1.0	54	45.1	0.27	2.03	1.88	20.98	0.12	0.14	0.27	.	.	.	.
547	51.0	2	20FEB81:17:40	.	6	0.09	0.0205	8.9	1.0	44	60.0	0.19	2.14	1.60	20.58	0.11	0.14	0.24	.	.	.	.
548	51.0	2	20FEB81:18:00	.	7	0.06	0.0100	9.9	1.0	30	52.0	0.13	1.99	1.71	20.98	0.11	0.14	0.23	.	.	.	.
549	56.1	2	23FEB81:12:28	23FEB81:17:39	.	0.13	0.0400	5.0	1.0	75	.	0.14	1.82	1.47	12.35	0.09	.	0.23	.	.	.	.

APPENDIX A-3

COMPOSITE DATA CALCULATED FROM SEQUENTIALLY MONITORED RUNOFF EVENTS

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------------------------------------------------------------ STA=51CR01 ------------------------------------------------------------

OBS  STRMNO      TI1             TI2           FLO      TSS     COD    NH3    TKN    SKN    NO23    OP    TSP    TP     T7N  S7N  TPR  SPR

  1  143.0  23MAY79:05:45  23MAY79:08:35  0.1850   609.0   125.0   0.29   6.33   1.99   1.30   0.01   0.27   1.65    .    .    .    .
  2  145.0  25MAY79:02:00  25MAY79:04:30  0.3516  1150.0   190.0   0.18   5.68   1.32   1.18   0.03   0.17   1.77    .    .    .    .
  3  145.1  25MAY79:15:46  25MAY79:17:00  0.6223  2380.0   233.0   0.14   8.64   2.00   0.83   0.05   0.32   3.49    .    .    .    .
  4  223.0  11AUG79:16:16  11AUG79:16:43  0.0644   168.0    68.0   0.40   3.02   1.76   2.00   0.61   1.02   1.55    .    .    .    .
  5  231.0  19AUG79:16:37  20AUG79:12:50  0.0403     7.6      .    0.18   1.04   0.57   2.22   0.02   0.04   0.11    .    .    .    .
  6  235.0  23AUG79:15:00  23AUG79:16:55  0.1704   100.0    29.8   0.05   1.76   0.87   1.45   0.05   0.08   0.36    .    .    .    .
  7   14.0  14JAN80:13:10  14JAN80:16:09  0.6048  1360.0   277.0   0.82   9.44   2.26   1.87   0.28   0.44   2.89   80    0    0    0
  8  140.0  19MAY80:21:27  19MAY80:23:39  0.2880      .    170.0   0.42   3.29   1.16   1.67   0.06   0.09   0.83    .    .    .    .
  9  214.0  01AUG80:13:21  01AUG80:15:14  0.1274   278.0    45.5   0.10    .      .     1.23   0.04    .      .      .    .    .    .
 10  269.0  25SEP80:06:51  25SEP80:10:25  0.0703   145.0    62.2   0.17   1.82   0.72   0.67   0.08   0.11   0.56    .    .    .    .
 11   42.0  11FEB81:00:48  11FEB81:13:10  0.6940  1160.0   230.0   2.08   7.99   4.21   1.76   0.28   0.43   1.51    .    .    .    .

------------------------------------------------------------ STA=51CR02 ------------------------------------------------------------

OBS  STRMNO      TI1             TI2           FLO      TSS   COD    NH3    TKN    SKN     NO23    OP    TSP    TP     T7N  S7N  TPR  SPR

 12    223  11AUG79:16:40  11AUG79:16:56  0.0549    49.0   33.1   0.20   1.21   0.76    2.49   0.16   0.22   0.40    .    .    .    .
 13    233  21AUG79:02:05  21AUG79:02:34  0.0160    13.5   21.7   0.10   1.15   0.86    2.39   0.08   0.12   0.17    .    .    .    .
 14    235  23AUG79:15:14  23AUG79:15:33  0.0410     9.8   17.2   0.06   0.88   0.61    2.22   0.05   0.07   0.12    .    .    .    .
 15     18  18JAN80:09:30  22JAN80:08:45  0.1556   222.0   48.1   0.05   1.60   0.97   13.40   0.01   0.05   0.22   20    0    0    0
 16    100  09APR80:01:47  09APR80:12:00  0.4866   524.0   65.6   0.11   3.47   0.63    5.03   0.02   0.07   1.06    .    .    .    .
 17    214  01AUG80:13:47  01AUG80:14:10  0.0356   144.0   47.4   0.20    .      .      1.58   0.07    .      .      .    .    .    .
 18     42  11FEB81:04:12  11FEB81:06:21  0.0633   121.0   90.4   0.40   3.79   2.86   10.58   0.15   0.22   0.45    .    .    .    .

------------------------------------------------------------ STA=51CR03 ------------------------------------------------------------

OBS  STRMNO      TI1             TI2           FLO      TSS     COD   NH3    TKN    SKN    NO23    OP    TSP     TP    T7N  S7N  TPR  SPR

 19    248  05SEP79:14:10  05SEP79:19:05  0.0864     4.6    57.6   0.36   1.89   1.71   0.24   0.54   0.68   0.76    .    .    .    .
 20    100  09APR80:03:18  09APR80:05:23  0.2282    57.0   207.0   1.95   5.72   4.58   0.30   0.67   1.26   1.58    .    .    .    .

------------------------------------------------------------ STA=51CR04 ------------------------------------------------------------

  OBS  STRMNO      TI1             TI2           FLO     TSS   COD    NH3    TKN    SKN    NO23    OP    TSP     TP    T7N  S7N  TPR  SPR

  21     145  25MAY79:03:32  25MAY79:04:15  0.0662   112   67.9   2.34   5.82   3.92   0.29   0.04   0.14   0.42    .    .    .    .
  22      18  18JAN80:10:07  22JAN80:09:10  0.1587    14   20.7   0.11   0.84   0.68   3.23   0.03   0.08   0.10    0    0    0    0

------------------------------------------------------------ STA=51CR05 ------------------------------------------------------------

OBS  STRMNO      TI1             TI2           FLO      TSS     COD    NH3    TKN    SKN    NO23    OP    TSP     TP    T7N  S7N  TPR  SPR

 23    248  05SEP79:15:25  05SEP79:18:50  0.2785    11.7    73.7   0.18   1.64   0.98   0.08   0.08   0.20   0.29    .    .    .    .
 24     18  18JAN80:13:55  19JAN80:00:28  0.2040   149.0    42.8   0.23   2.33   1.30   0.27   0.06   0.09   0.34    0    0    0    0
 25     81  21MAR80:09:45  21MAR80:14:15  0.3084   845.0      .    0.26   4.89   1.33   0.20   0.07   0.10   1.16    .    .    .    .
 26     91  31MAR80:04:15  31MAR80:07:00  0.0549   105.0      .    0.16   1.30   0.57   0.52   0.00   0.06   0.22    .    .    .    .
 27    100  09APR80:03:00  09APR80:11:50  0.0262    68.0      .    0.18   1.65   0.90   0.12   0.01   0.04   0.14    .    .    .    .
 28     42  11FEB81:03:48  11FEB81:07:35  0.0073   127.0   150.0   0.67    .      .     0.52   0.18   0.36   0.69    .    .    .    .
```

APPENDIX A-3

COMPOSITE DATA CALCULATED FROM SEQUENTIALLY MONITORED RUNOFF EVENTS

```
------------------------------------------------------------ STA=51CR07 ------------------------------------------------------------
OBS  STRMNO      TI1               TI2               FLO      TSS     COD     NH3   TKN    SKN    NO23   OP     TSP    TP     TZN  SZN  TPB  SPB

29   162.0   11JUN79:05:25   11JUN79:06:20      0.4865   337.0   166.0   0.45  2.72   2.20   0.80   0.00   0.25   0.62    .    .    .    .
30   162.1   11JUN79:08:48   11JUN79:09:14      0.4865    60.0    64.7   0.22  3.92   0.94   0.80   0.01   0.26   0.70    .    .    .    .
31   168.0   17JUN79:04:45   17JUN79:05:57      0.8971   207.0    89.1   0.08  4.03   0.88   0.29   0.02   0.22   0.72    .    .    .    .
32   168.1   17JUN79:09:55   17JUN79:10:52      0.5836    79.0    65.0   0.11  1.36   0.53   0.27   0.01   0.11   0.26    .    .    .    .
33   174.0   23JUN79:21:08   23JUN79:21:55      0.7049   154.0   101.0   0.08  3.54   1.64   0.98   0.01   0.30   0.62    .    .    .    .
34   179.0   28JUN79:22:10   28JUN79:23:02      0.4865    67.0      .    0.14  1.25   0.38   0.60   0.00   0.04   0.22    .    .    .    .
35   185.0   04JUL79:12:35   04JUL79:16:20      1.1236    36.0      .    0.11  1.09   0.90   0.81   0.02   0.07   0.13    .    .    .    .
36   231.0   19AUG79:20:17   19AUG79:20:50      2.5836   122.0      .    0.13  1.64   0.49   0.61   0.00   0.03   0.24    .    .    .    .
37   233.0   21AUG79:01:35   21AUG79:04:58      0.4111    17.6      .    0.20  0.72   0.46   1.03   0.01   0.05   0.08    .    .    .    .
38   236.0   24AUG79:19:04   24AUG79:19:47      1.7518   116.0      .    0.18  1.99   0.93   0.51   0.00   0.12   0.36    .    .    .    .
39   236.1   24AUG79:19:57   24AUG79:20:20      2.6993   144.0      .    0.16  1.84   0.60   0.65   0.03   0.05   0.25    .    .    .    .
40   237.0   25AUG79:19:08   25AUG79:20:37      0.1095    14.5      .    0.11  0.66   0.36   0.78   0.00   0.03   0.09    .    .    .    .
41   238.0   26AUG79:03:12   26AUG79:03:48      2.7441    51.0      .    0.09  1.29   0.83   0.34   0.05   0.07   0.14    .    .    .    .
42   248.0   05SEP79:11:10   05SEP79:22:30     14.2161    68.0      .    0.12  0.95   0.59   0.30   0.10   0.14   0.22    .    .    .    .
43   264.0   21SEP79:23:08   22SEP79:00:25      8.9357   168.0    39.4   0.09  1.74   0.62   0.30   0.12   0.13   0.39    .    .    .    .
44   264.1   22SEP79:01:17   22SEP79:01:58      9.5224   132.0    33.5   0.13  1.37   0.53   0.25   0.10   0.17   0.37    .    .    .    .
45   274.0   01OCT79:16:02   01OCT79:17:15     14.8712   158.0      .    0.25  1.41   0.60   0.24   0.10   0.10   0.33    .    .    .    .
46   274.1   01OCT79:17:32   01OCT79:20:14      9.3448   119.0      .    0.17  0.91   0.42   0.15   0.09   0.10   0.22    .    .    .    .
47   274.2   02OCT79:13:03   02OCT79:13:35      3.4250    41.0      .    0.08  0.66   0.39   0.50   0.04   0.08   0.14    .    .    .    .
48   275.0   03OCT79:05:13   03OCT79:06:10      3.4250    23.8      .    0.14  0.88   0.78   0.33   0.08    .      .      .    .    .    .
49   278.0   05OCT79:22:35   05OCT79:23:28      3.4250    37.0      .    0.14  1.22   0.82   0.36   0.09   0.11   0.23    .    .    .    .
50    18.0   18JAN80:07:30   18JAN80:14:45      1.5463    56.0    40.4   0.13  0.97   0.60   0.54   0.06   0.06   0.16   50   25   85    0
51    18.1   18JAN80:15:51   19JAN80:11:30      1.6039    23.7    29.0   0.14  0.88   0.67   0.59   0.10   0.10   0.15   30   20    0    0
52    53.0   22FEB80:01:30   22FEB80:05:[illegible]     0.4865   170.0      .    0.14  1.74   0.65   1.41   0.01   0.04   0.34    .    .    .    .
53   100.0   09APR80:03:50   09APR80:09:3[illegible]     0.5307   242.0      .    0.27  2.04   0.99   0.26   0.06   0.08   0.39    .    .    .    .
54   190.0   08JUL80:08:34   08JUL80:10:5[illegible]     1.2268      .     57.7   0.21  1.03   0.63   0.73   0.01   0.05   0.14    .    .    .    .
55   269.0   25SEP80:03:55   25SEP80:12:43      0.1277    82.0    35.7   0.16  1.77   0.70   0.75   0.03   0.09   0.39    .    .    .    .
56    52.0   21FEB81:00:10   21FEB81:12:41      0.1811      .     20.2   0.12  0.61   0.30   0.55   0.02   0.03   0.13    .    .    .    .

------------------------------------------------------------ STA=51CR08 ------------------------------------------------------------
OBS  STRMNO      TI1               TI2               FLO      TSS     COD     NH3   TKN    SKN    NO23   OP     TSP    TP     TZN  SZN  TPB  SPB

57    168    17JUN79:05:19   17JUN79:05:43      1.9682   795.0   136.0   0.08  3.80   1.08   0.50   0.00   0.16   0.96    .    .    .    .
58    222    10AUG79:22:43   11AUG79:00:17      0.4922   294.0      .    0.07  1.83   0.91   0.90   0.00   0.09   0.18    .    .    .    .
59    233    21AUG79:10:33   21AUG79:17:00      0.4922    64.0      .    0.06  0.80   0.41   0.11   0.01   0.02   0.11    .    .    .    .
60    236    24AUG79:21:15   25AUG79:11:55      0.2362   143.0      .    0.25 11.79   1.23   0.34   0.01   0.11   2.80    .    .    .    .
61    237    25AUG79:20:04   26AUG79:14:10      0.5434     6.2      .    0.10  0.57   0.47   0.13   0.00   0.04   0.06    .    .    .    .
62    105    14APR80:12:05   14APR80:15:50      1.3746    69.0   129.0   0.32  1.29   0.96   0.53   0.03   0.05   0.14    .    .    .    .
63    190    08JUL80:08:10   08JUL80:13:42      2.6594   187.0    37.6   0.22  1.45   0.60   0.85   0.06   0.07   0.32    .    .    .    .
64    269    25SEP80:05:32   25SEP80:13:08      0.0579   454.0    33.0   0.31  0.71   0.71   1.46   0.05    .     0.12    .    .    .    .
65    337    02DEC80:19:44   02DEC80:21:12      0.2278    64.0    40.4   0.16   .      .     1.17   0.03    .      .      .    .    .    .
66     50    19FEB81:23:00   20FEB81:06:00      0.8938   251.0    31.7   0.33  0.92   0.69   0.53   0.15   0.20   0.31    .    .    .    .
```

APPENDIX A-3

COMPOSITE DATA CALCULATED FROM SEQUENTIALLY MONITORED RUNOFF EVENTS

```
------------------------------------------------------------- STA=51CR09 -----------------------------------------------------------

  OBS  STRMNO       TI1            TI2           FLO     TSS   COD    NH3   TKN   SKN   NO23   OP    TSP    TP   TZN  SZN  TPB  SPB

   67    248   05SEP79:14:12  06SEP79:01:10  6.4718   161   48.4   0.27  4.28  0.71  0.18  0.07  0.07  1.37   .    .    .    .
   68     18   18JAN80:13:38  19JAN80:05:08  0.8581    88   27.2   0.02  0.90  0.63  0.19  0.02  0.04  0.17   0    0    0    0
   69    100   09APR80:06:30  09APR80:14:45  0.6675    52   14.5   0.05  0.50  0.23  0.08  0.01  0.04  0.12   .    .    .    .
   70    190   08JUL80:15:31  09JUL80:14:30  0.1145   116    9.0   0.03  0.31  0.20  0.16  0.02  0.04  0.08   .    .    .    .
   71    204   22JUL80:16:57  22JUL80:19:36  0.1023   491   87.8   0.06  1.99  0.41  0.20  0.03  0.07  0.68   .    .    .    .
   72     33   02FEB81:07:45  02FEB81:11:55  0.0280    32   29.1   0.05  0.70  0.49  0.52  0.02  0.04  0.09   .    .    .    .
   73     42   11FEB81:03:07  11FEB81:15:50  0.1170    46   33.4   0.09  0.87  0.45  0.46  0.02  0.07  0.16   .    .    .    .

------------------------------------------------------------- STA=51CR10 -----------------------------------------------------------
 OBS  STRMNO       TI1            TI2           FLO      TSS      COD    NH3   TKN   SKN    NO23   OP    TSP    TP    TZN  SZN  TPB  SPB

  74    235   23AUG79:14:22  23AUG79:14:29  0.0160  1000.0    69.2   0.23  4.48  0.74   5.30  0.10  0.18  1.78    .    .    .    .
  75    248   05SEP79:13:43  05SEP79:20:55  1.0026    41.0    41.1   0.12  1.50  1.07   1.99  0.21  0.25  0.36    .    .    .    .
  76     12   12JAN80:00:15  12JAN80:05:53  0.0549    15.1   784.0   0.39  1.81  1.61   8.50  0.18  0.23  0.32   28    0    0    0
  77    122   01MAY80:01:40  01MAY80:13:00  0.0236    50.0      .    0.11  1.32  0.95   1.15  0.05  0.10  0.20    .    .    .    .
  78     51   20FEB81:12:50  20FEB81:18:00  0.0591   243.0    63.3   0.14  2.65  1.63  20.84  0.14  0.15  0.62    .    .    .    .
```

                                   APPENDIX A-4
                  FLOW AND CONCENTRATION DATA FOR BASEFLOW PERIODS

```
------------------------------------------------------------- STA=SICR01 ---------------------------------------------------------------------
ORS  TYPE       TII           STG     FLO     SAMNO   TSS   COD   NH3    TKN    SKN    NO23   OP     TSP    TP     TZN  S2N  TPR  SPR

  1   3    12JUN79:14:30     0.40   0.3630     1      6.8   .    0.02   0.21   0.14   3.46   0.01   0.03   0.04     .    .    .    .
  2   1    18JUN79:12:00     0.20   0.0990     1     17.2   .    0.04   0.34   0.32   3.49   0.01   0.03   0.06     0    0    0    0
  3   1    25JUN79:10:55     0.10   0.0298     1     12.8   .    0.04   0.51   0.30   2.68   0.00   0.04   0.06     .    .    .    .
  4   3    02JUL79:10:00     0.30   0.2090     1     13.6   .    0.06   0.73   0.73   2.97   0.00   0.03   0.06     0    0    0    0
  5   1    09JUL79:13:00     0.10   0.0298     1      2.0   .    0.03   0.48   0.38   2.70   0.02   0.03   0.04     0    0    0    0
  6   1    16JUL79:10:30     0.10   0.0298     1      3.6   .    0.12   0.64   0.56   3.01   0.01   0.03   0.04     0    0    0    0
  7   1    23JUL79:10:10     0.10   0.0298     1      5.2   .    0.08   0.41   0.37   2.40   0.00   0.03   0.05     0    0    0    0
  8   1    30JUL79:10:20     0.15   0.0595     1      3.2   .    0.11   0.64   0.66   2.01   0.01   0.06   0.07     0    0    0    0
  9   1    06AUG79:12:00     0.13   0.0465     1      4.8   .    0.03   0.23   0.23   2.19   0.01   0.02   0.03     0    0    0    0
 10   1    13AUG79:16:10     0.19   0.0903     1      6.4   .    0.02   0.31   0.25   1.97   0.02   0.03   0.05     0    0    0    0
 11   1    27AUG79:10:50     0.18   0.0820     1      6.8   .    0.07   0.51   0.46   2.06   0.01   0.04   0.04     0    0    0    0
 12   1    04SEP79:12:00     0.14   0.0528     1      5.0   .    0.08   0.58   0.56   2.77   0.01   0.03   0.04     0    0    0    0
 13   1    10SEP79:12:45     0.30   0.2090     1     24.0   .    0.06   0.51   0.21   2.92   0.02   0.03   0.07    20   20    0    0
 14   1    17SEP79:14:35     0.19   0.0903     1     48.0   .    0.05   0.46   0.32   3.17   0.00   0.06   0.13     0    0    0    0
 15   1    24SEP79:12:50     0.25   0.1486     1      7.6   .    0.03   0.30   0.26   3.29   0.00   0.03   0.04     0    0    0    0
 16   3    15OCT79:16:15     0.40   0.3630     1      6.0   .    0.05   0.27   0.25   4.22   0.00   0.04   0.05    20   20    0    0
 17   1    22OCT79:10:30     0.20   0.0990     1      6.8   .    0.05   0.31   0.26   4.56   0.00   0.02   0.06     0    0    0    0
 18   1    29OCT79:09:00     0.19   0.0903     1     11.6   .    0.05   0.26   0.16   3.63   0.01   0.06   0.08    15   10    0    0
 19   1    05NOV79:11:20     0.20   0.0990     1      6.0   .    0.07   0.24   0.22   4.01   0.01   0.03   0.05     0    0    0    0
 20   1    19NOV79:14:20     0.20   0.0990     1      8.5   .    0.13   0.67   0.59   3.64   0.03   0.05   0.08    10   10    0    0
 21   1    03DEC79:10:50     0.15   0.0595     1     54.0   .    0.09   0.43   0.23   4.92   0.01   0.03   0.12     0    0    0    0
 22   1    10DEC79:11:00     0.18   0.0820     1      6.0   .    0.04   0.30   0.26   3.86   0.01   0.03   0.05     0    0    0    0
 23   1    17DEC79:11:15     0.15   0.0595     1     11.8   .    0.05   0.36   0.31   3.96   0.01   0.04   0.07     0    0    0    0
 24   1    07JAN80:10:30     0.13   0.0465     1     67.0   .    0.16   0.68   0.37   3.65   0.02   0.03   0.10     0    0    0    0
 25   3    28JAN80:11:00     0.28   0.1834     1     38.0   .    0.04   0.39   0.24   4.34   0.01   0.02   0.08     0    0    0    0
 26   1    04FEB80:09:35     0.21   0.1081     1     55.0   .    0.08   0.51   0.27   5.03   0.01   0.03   0.13     0    0    0    0
 27   1    11FEB80:10:00     0.12   0.0406     1      2.8   .    0.04   0.19   0.04   5.45   0.01   0.01   0.03     0    0    0    0
 28   1    10MAR80:10:40     0.10   0.0298     1     13.6   .    0.03   0.47   0.36   3.39   0.01   0.02   0.05     .    .    .    .
 29   1    24MAR80:11:10     0.40   0.3630     1      9.5   .    0.04   0.22   0.12   4.07   0.03   0.06   0.07     .    .    .    .
 30   3    07APR80:13:10     0.29   0.1960     1     12.4   .    0.07   0.44   0.36   4.12   0.02   0.02   0.05     .    .    .    .
 31   3    14APR80:10:30     0.26   0.1597     1     19.0   .    0.08   0.59   0.41   4.31   0.00   0.01   0.06     .    .    .    .
 32   3    21APR80:09:15     0.25   0.1486     1     15.2   .    0.04   0.61   0.32   4.18   0.00   0.03   0.06     .    .    .    .
 33   1    05MAY80:14:30     0.22   0.1179     1     16.8   .    0.05   0.53   0.40   4.27   0.00   0.02   0.06     .    .    .    .
 34   1    12MAY80:12:00     0.26   0.1597     1     14.5   .    0.03   0.44   0.27   4.08   0.00   0.02   0.06     .    .    .    .
 35   1    19MAY80:09:10     0.25   0.1486     1      9.0   .    0.05   0.59   0.41   3.26   0.00   0.02   0.05     .    .    .    .
 36   1    02JUN80:10:10     0.22   0.1176     1     11.2   .    0.07   0.40   0.29   3.81   0.01   0.03   0.05     .    .    .    .
 37   1    09JUN80:12:40     0.21   0.1081     1     22.8   .    0.05   0.53   0.36   3.90   0.02   0.02   0.06     .    .    .    .
 38   1    16JUN80:10:25     0.21   0.1081     1      4.0   .    0.08   0.42   0.36   3.09   0.01   0.03   0.05     .    .    .    .
 39   1    23JUN80:10:00     0.17   0.0741     1      2.8   .    0.02   0.56   0.48   3.13   0.00   0.02   0.03     .    .    .    .
 40   1    30JUN80:10:00     0.14   0.0528     1      3.2   .    0.05   0.36   0.34   2.90   0.00   0.01   0.02     .    .    .    .
 41   1    07JUL80:10:10     0.12   0.0406     1      2.4   .    0.04   0.27   0.27   2.76   0.00   0.03   0.04     .    .    .    .
 42   1    14JUL80:12:00     0.11   0.0350     1      5.6   .    0.03   0.20   0.20   1.92   0.02   0.03   0.04     .    .    .    .
 43   1    21JUL80:11:35     0.11   0.0350     1      3.2   .    0.04   0.24   0.24   1.65   0.00   0.04   0.05     .    .    .    .
 44   1    28JUL80:11:10     0.11   0.0350     1      8.4   .    0.04   0.26   0.22   1.44   0.00   0.03   0.04     .    .    .    .
 45   1    04AUG80:11:30     0.11   0.0350     1     15.2   .    0.05   0.33   0.25   1.39   0.01   0.03   0.07     .    .    .    .
 46   1    11AUG80:11:30     0.11   0.0350     1     10.6   .    0.06   0.39   0.11   1.18   0.01   0.04   0.07     .    .    .    .
 47   1    25AUG80:11:00     0.08   0.0200     1     23.2   .    0.08   0.55   0.30   0.97   0.01   0.05   0.09     .    .    .    .
 48   1    08SEP80:08:50     0.07   0.0158     1      9.0   .    0.05   0.28   0.25   0.55   0.01   0.02   0.05     .    .    .    .
 49   1    15SEP80:10:20     0.07   0.0158     1      4.0   .    0.06   0.23   0.17   0.31   0.01   0.02   0.03     .    .    .    .
 50   1    22SEP80:09:50     0.07   0.0158     1      4.0   .    0.06   0.21   0.21   0.33   0.01   0.02   0.04     .    .    .    .
 51   1    29SEP80:10:05     0.07   0.0158     1      2.0   .    0.06   0.16   0.12   0.70   0.01   0.02   0.03     .    .    .    .
 52   1    06OCT80:10:05     0.08   0.0200     1      3.8   .    0.08   0.32   0.27   0.72   0.01   0.04   0.05     .    .    .    .
```

APPENDIX A-4

FLOW AND CONCENTRATION DATA FOR BASEFLOW PERIODS

STA=SICR01

OBS	TYPE	TII	STG	FLO	SAMNO	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	T7N	S7N	TPR	SPR
53	|	20OCT80:10:10	0.07	0.0158	|	6.5	.	0.20	0.51	0.43	0.70	0.01	0.05	0.07	.	.	.	.
54	|	27OCT80:09:15	0.07	0.0158	|	3.0	.	0.35	0.64	0.64	1.43	0.02	0.02	0.05	.	.	.	.
55	|	03NOV80:09:00	0.05	0.0089	|	9.0	.	0.28	0.79	0.70	1.27	0.01	0.03	0.07	.	.	.	.
56	|	10NOV80:11:10	0.06	0.0061	|	2.0	.	0.23	0.66	0.66	0.88	0.02	0.05	0.12	.	.	.	.
57	|	17NOV80:10:25	0.05	0.0089	|	2.5	.	0.41	0.76	0.70	1.36	0.01	0.04	0.05	.	.	.	.
58	|	01DEC80:11:40	0.07	0.0186	|	14.0	.	0.10	0.74	0.74	2.08	0.01	0.03	0.05	.	.	.	.
59	|	08DEC80:09:20	0.06	0.0143	|	3.0	.	0.13	0.39	0.39	1.54	0.02	0.02	0.04	.	.	.	.
60	|	15DEC80:10:55	0.08	0.0236	|	2.0	.	0.12	0.36	0.27	1.72	0.00	0.01	0.02	.	.	.	.
61	|	26JAN81:10:40	0.04	0.0060	|	6.0	.	0.95	1.80	1.10	1.15	0.02	0.07	0.07	.	.	.	.
62	|	09FEB81:12:10	0.06	0.0121	|	5.0	.	0.63	1.45	1.41	1.76	0.01	.	0.05	.	.	.	.
63	|	02MAR81:10:40	0.09	0.0247	|	2.0	.	0.22	0.54	0.50	6.94	0.00	0.00	0.00	.	.	.	.
64	|	09MAR81:09:50	0.09	0.0247	|	2.0	.	0.09	0.35	0.31	6.01	0.01	0.01	0.02	.	.	.	.
65	|	16MAR81:09:25	0.09	0.0247	|	3.0	.	0.10	0.60	0.58	.	0.00	0.00	0.00	.	.	.	.
66	|	23MAR81:09:20	0.08	0.0200	|	1.0	.	0.05	0.30	0.28	3.66	0.01	0.01	0.03	.	.	.	.
67	|	06APR81:11:05	0.07	0.0158	|	1.0	.	0.06	0.46	0.40	3.24	0.01	0.01	0.02	.	.	.	.
68	|	20APR81:09:25	0.08	0.0200	|	1.0	.	0.05	0.61	0.42	2.60	0.01	0.04	0.06	.	.	.	.
69	|	27APR81:10:10	0.08	0.0200	|	5.0	.	0.09	0.55	0.48	2.44	0.02	0.03	0.06	.	.	.	.
70	|	04MAY81:12:15	0.08	0.0200	|	6.0	.	0.09	0.77	0.61	3.45	0.02	0.03	0.06	.	.	.	.
71	|	11MAY81:09:25	0.10	0.0298	|	7.0	.	0.13	0.75	0.64	2.51	0.01	0.03	0.05	.	.	.	.
72	|	18MAY81:11:25	0.12	0.0406	|	4.0	.	0.06	0.31	0.31	3.68	0.01	0.03	0.03	.	.	.	.

STA=SICR02

OBS	TYPE	TII	STG	FLO	SAMNO	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	T7N	S7N	TPR	SPR
73	|	12JUN79:14:40	0.20	0.0850	|	2.0	.	0.06	0.50	0.41	4.90	0.01	0.04	0.05	.	.	.	.
74	|	18JUN79:13:00	0.10	0.0248	|	2.8	.	0.06	0.45	0.39	4.72	0.02	0.03	0.04	0	0	0	0
75	|	25JUN79:09:45	0.10	0.0248	|	38.0	.	0.06	0.66	0.51	5.05	0.00	0.05	0.10	.	.	.	.
76	|	02JUL79:11:05	0.50	0.5090	|	1.2	.	0.06	0.64	0.51	2.87	0.00	0.03	0.04	0	0	0	0
77	|	09JUL79:13:15	0.04	0.0050	|	0.8	.	0.01	0.46	0.46	.	0.01	0.03	0.04	0	0	0	0
78	|	16JUL79:10:50	0.03	0.0031	|	1.2	.	0.08	0.68	0.52	3.25	0.00	0.03	0.04	0	0	0	0
79	|	23JUL79:11:30	0.04	0.0050	|	1.6	.	0.10	0.63	0.46	3.83	0.01	0.05	0.05	0	0	0	0
80	|	30JUL79:11:50	0.06	0.0100	|	1.6	.	0.11	1.27	0.76	3.85	0.01	0.07	0.08	.	.	0	0
81	|	06AUG79:12:45	0.05	0.0073	|	1.2	.	0.03	0.40	0.30	3.41	0.01	0.03	0.03	0	0	0	0
82	|	13AUG79:17:15	0.10	0.0248	|	1.2	.	0.04	0.25	0.25	3.55	0.02	0.03	0.04	0	0	0	0
83	|	20AUG79:12:10	0.05	0.0073	|	0.4	.	0.02	0.67	0.42	3.23	0.01	0.04	0.04	135	10	0	0
84	|	27AUG79:11:30	0.10	0.0248	|	1.2	.	0.05	0.32	0.32	3.17	0.01	0.03	0.04	0	0	0	0
85	|	06SEP79:13:00	0.10	0.0248	|	8.0	.	0.05	0.70	0.42	3.34	0.01	0.03	0.06	50	.	0	0
86	|	10SEP79:12:40	0.20	0.0850	|	15.0	.	0.08	0.70	0.42	3.07	0.03	0.03	0.06	0	0	0	0
87	|	17SEP79:15:15	0.11	0.0293	|	51.0	.	0.11	1.31	0.44	3.39	0.00	0.06	0.19	0	0	0	0
88	|	24SEP79:13:30	0.22	0.1015	|	10.4	.	0.03	0.51	0.41	3.39	0.00	0.04	0.07	10	10	0	0
89	|	15OCT79:16:40	0.25	0.1290	|	44.0	.	0.05	0.69	0.38	5.19	0.00	0.04	0.13	0	0	0	0
90	|	22OCT79:10:00	0.15	0.0505	|	16.0	.	0.07	0.52	0.39	3.97	0.00	0.03	0.06	80	50	0	0
91	|	29OCT79:09:30	0.12	0.0341	|	2.0	.	0.07	0.17	0.16	3.53	0.01	0.04	0.05	0	0	0	0
92	|	05NOV79:11:25	0.10	0.0248	|	14.8	.	0.07	0.30	0.18	4.11	0.01	0.04	0.07	0	0	0	0
93	|	19NOV79:14:00	0.11	0.0293	|	46.0	.	0.15	0.65	0.23	3.92	0.02	0.04	0.13	85	55	0	0
94	|	03DEC79:10:30	0.08	0.0166	|	20.0	.	0.09	0.31	0.25	5.51	0.01	0.03	0.07	0	0	0	0
95	|	10DEC79:10:10	0.18	0.0701	|	11.2	.	0.08	0.45	0.41	4.26	0.02	0.05	0.07	0	0	0	0
96	|	17DEC79:10:40	0.08	0.0166	|	180.0	.	0.17	1.44	0.48	4.72	0.03	0.05	0.28	15	0	0	0
97	|	07JAN80:10:00	0.13	0.0392	|	60.0	.	0.72	2.05	1.36	4.24	0.04	0.06	0.20	40	10	0	0
98	|	28JAN80:11:40	0.10	0.0248	|	71.0	.	0.12	0.92	0.42	5.61	0.01	0.02	0.16	0	0	0	0

APPENDIX A-4

FLOW AND CONCENTRATION DATA FOR BASEFLOW PERIODS

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------------------------------------------------------------------ STA=51CR02 ------------------------------------------------------------------
 OBS  TYPE       TII          STG     FLO    SAMNO    TSS   COD   NH3   TKN   SKN   NO23   OP    TSP    TP   T7N  S7N  TPR  SPR

  99    1   04FEB80:09:50   0.20  0.0850    1     336.0    .   0.74  3.79  1.19   5.84  0.02  0.05  0.85    0    0    0    0
 100    1   11FEB80:10:10   0.07  0.1030    1     689.0    .   0.30  3.70  0.44   6.71  0.01  0.03  1.12   30    0    0    0
 101    1   10MAR80:10:00   0.02  0.0014    1     255.0    .   0.07  1.93  0.11   5.06  0.01  0.03  0.53    .    .    .    .
 102    1   24MAR80:10:05   0.02  0.0014    1       6.5    .   0.02  0.33  0.08   7.33  0.02  0.05  0.06    .    .    .    .
 103    1   07APR80:12:45   0.16  0.0447    1       4.4    .   0.07  0.33  0.33   5.97  0.01  0.02  0.03    .    .    .    .
 104    1   14APR80:09:59   0.15  0.0505    1       2.8    .   0.12  0.48  0.33   5.60  0.01  0.01  0.02    .    .    .    .
 105    1   21APR80:09:35   0.16  0.0567    1       6.0    .   0.10  0.20  0.20   5.93  0.00  0.03  0.04    .    .    .    .
 106    1   05MAY80:15:05   0.18  0.0701    1       2.0    .   0.11  0.51  0.51   6.36  0.00  0.02  0.04    .    .    .    .
 107    1   12MAY80:11:30   0.16  0.0567    1      11.5    .   0.05  0.50  0.50   6.10  0.00  0.02  0.06    .    .    .    .
 108    1   19MAY80:09:30   0.14  0.0447    1      40.0    .   0.07  0.66  0.35   4.57  0.00  0.02  0.08    .    .    .    .
 109    1   02JUN80:09:30   0.08  0.0166    1      26.0    .   0.17  0.58  0.40   5.13  0.01  0.03  0.08    .    .    .    .
 110    1   09JUN80:11:55   0.08  0.0166    1       4.0    .   0.07  0.43  0.36   5.64  0.01  0.02  0.04    .    .    .    .
 111    1   16JUN80:09:30   0.10  0.0248    1       9.6    .   0.16  0.53  0.46   4.11  0.01  0.04  0.05    .    .    .    .
 112    1   23JUN80:09:30   0.05  0.0073    1       1.6    .   0.06  0.81  0.77   3.62  0.00  0.03  0.03    .    .    .    .
 113    1   30JUN80:09:15   0.07  0.0130    1       4.0    .   0.07  0.49  0.43   3.18  0.01  0.02  0.03    .    .    .    .
 114    1   07JUL80:09:40   0.05  0.0073    1       4.8    .   0.03  0.37  0.33   2.93  0.00  0.04  0.04    .    .    .    .
 115    1   14JUL80:12:35   0.04  0.0050    1       8.5    .   0.07  0.33  0.31   2.35  0.02  0.03  0.04    .    .    .    .
 116    1   21JUL80:12:00   0.03  0.0031    1       2.0    .   0.08  0.45  0.45   1.33  0.00  0.05  0.05    .    .    .    .
 117    1   28JUL80:10:35   0.04  0.0050    1       8.8    .   0.04  0.32  0.28   1.16  0.01  0.04  0.04    .    .    .    .
 118    1   04AUG80:12:00   0.02  0.0014    1      21.2    .   0.05  0.59  0.41   0.18  0.01  0.04  0.08    .    .    .    .
 119    1   11AUG80:11:05   0.01  0.0007    1       0.0    .   0.08  0.47  0.45   0.03  0.01  0.05  0.05    .    .    .    .
 120    1   02MAR81:11:00   0.06  0.0100    1       0.0    .   0.10  0.41  0.37  10.95  0.00  0.00  0.00    .    .    .    .
 121    1   09MAR81:10:10   0.03  0.0030    1       0.0    .   0.07  0.35  0.35   8.81  0.00  0.01  0.01    .    .    .    .

------------------------------------------------------------------ STA=51CR03 ------------------------------------------------------------------
 OBS  TYPE       TII          STG     FLO    SAMNO    TSS   COD   NH3   TKN   SKN   NO23   OP    TSP    TP   T7N  S7N  TPR  SPR

 122    3   24MAR80:10:15   0.05  0.0073    1       2.0    .   0.06  0.29  0.29   2.06  0.03  0.07  0.07    .    .    .    .
 123    1   07APR80:12:45   0.02  0.0014    1       2.0    .   0.07   .     .     2.06  0.02   .     .      .    .    .    .
 124    1   14APR80:10:10   0.02  0.0014    1      14.0    .   0.06  0.46  0.22   1.64  0.01  0.01  0.05    .    .    .    .
 125    1   05MAY80:15:20   0.01  0.0007    1       2.4    .   0.17  0.42  0.30   1.08  0.02  0.03  0.04    .    .    .    .
 126    1   16JUN80:09:25   0.00  0.0000    1      47.0    .   0.56  1.84  1.28   0.14  0.03  0.07  0.23    .    .    .    .

------------------------------------------------------------------ STA=51CR04 ------------------------------------------------------------------
 OBS  TYPE       TII          STG     FLO    SAMNO    TSS   COD   NH3   TKN   SKN   NO23   OP    TSP    TP   T7N  S7N  TPR  SPR

 127    1   12JUN79:14:50   0.20  0.0850    1      26.0    .   0.36  1.95  0.99   3.34  0.01  0.06  0.14    .    .    .    .
 128    1   18JUN79:12:30   0.20  0.0850    1      29.0    .   0.18  2.34  0.84   2.28  0.01  0.05  0.13    0    0    0    0
 129    1   25JUN79:10:45   0.10  0.0248    1      37.0    .   0.69  2.48  1.92   1.34  0.01  0.08  0.17    .    .    .    .
 130    3   02JUL79:11:25   0.70  1.0300    1      18.4    .   0.42  2.13  1.51   0.99  0.01  0.06  0.12    0    0    0    0
 131    1   09JUL79:13:30   0.01  0.0007    1      24.4    .   0.11  2.11  1.15   0.60  0.02  0.07  0.19    0    0    0    0
 132    1   16JUL79:10:55   0.01  0.0007    1      16.8    .   0.10  1.96  1.00   0.35  0.00  0.05  0.12    0    0    0    0
 133    1   23JUL79:10:45   0.02  0.0014    1      35.0    .   0.60  3.05  2.79   0.32  0.02  0.07  0.30    0    0    0    0
 134    1   30JUL79:11:15   0.10  0.0248    1      47.0    .   1.29  4.06  2.44   0.31  0.05  0.11  0.29    0    0    0    0
 135    1   06AUG79:12:25   0.01  0.0007    1      40.0    .   0.78  3.06  1.81   0.51  0.03  0.06  0.20    0    0    0    0
 136    3   13AUG79:16:45   0.15  0.0505    1     130.0    .   0.22  7.65  1.26   0.36  0.02  0.07  0.54    0    0    0    0
 137    1   20AUG79:11:05   0.04  0.0050    1      38.0    .   0.78  1.76  1.30   0.56  0.05  0.05  0.13   60   40    0    0
 138    3   27AUG79:11:00   0.13  0.0392    1      64.0    .   0.33  3.79  1.22   0.44  0.04  0.07  0.10    0    0    0    0
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APPENDIX A-4

FLOW AND CONCENTRATION DATA FOR BASEFLOW PERIODS

STA=SICR04

ORS	TYPE	TII	STG	FLO	SAMNO	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	T7N	S7N	TPR	SPR
139	1	04SEP79:12:20	0.11	0.0293	1	44.0	.	0.26	2.63	1.11	0.71	0.02	0.06	0.19	20	.	0	0
140	1	10SEP79:12:20	0.02	0.0014	1	177.0	.	0.28	2.70	1.03	1.06	0.02	0.05	0.36	.	.	0	0
141	1	17SEP79:14:50	0.12	0.0341	1	24.0	.	0.19	2.18	1.47	0.58	0.02	0.10	0.14	0	0	0	0
142	3	24SEP79:13:12	0.26	0.1390	1	26.0	.	0.09	1.47	0.72	1.15	0.01	0.04	0.20	0	0	0	0
143	1	15OCT79:16:35	0.26	0.1390	1	28.0	.	0.15	0.84	0.57	2.76	0.00	0.03	0.10	135	115	0	0
144	1	22OCT79:10:50	0.19	0.0774	1	51.0	.	0.07	1.70	0.50	2.29	0.00	0.07	0.16	45	70	0	0
145	1	29OCT79:09:45	0.13	0.0392	1	23.6	.	0.05	0.71	0.36	2.06	0.00	0.04	0.08	0	0	0	0
146	1	05NOV79:11:40	0.12	0.0341	1	11.6	.	0.07	0.50	0.32	1.82	0.00	0.04	0.06	0	0	0	0
147	1	19NOV79:13:35	0.14	0.0447	1	1.1	.	0.13	0.57	0.45	1.94	0.01	0.04	0.07	75	55	0	0
148	1	03DEC79:10:40	0.09	0.0205	1	8.8	.	0.13	0.43	0.35	2.13	0.03	0.04	0.06	20	0	0	0
149	1	10DEC79:10:40	0.12	0.0341	1	3.6	.	0.08	0.32	0.28	1.76	0.02	0.04	0.06	0	0	0	0
150	1	17DEC79:11:00	0.09	0.0205	1	7.6	.	0.08	0.72	0.49	1.64	0.02	0.06	0.06	0	0	0	0
151	1	07JAN80:10:45	0.05	0.0073	1	3.6	.	0.10	0.74	0.60	1.54	0.02	0.04	0.05	0	0	0	0
152	1	28JAN80:11:30	0.14	0.0447	1	3.6	.	0.06	0.53	0.53	2.84	0.01	0.03	0.05	0	0	0	0
153	1	04FEB80:09:45	0.11	0.0293	1	4.0	.	0.14	0.56	0.56	3.27	0.00	0.04	0.06	0	0	0	0
154	1	11FEB80:10:05	0.06	0.0100	1	3.0	.	0.07	0.42	0.39	3.55	0.01	0.02	0.05	0	0	0	0
155	1	10MAR80:10:20	0.02	0.0014	1	170.0	.	0.09	1.35	0.64	1.31	0.00	0.05	0.23	.	.	.	.
156	1	24MAR80:10:35	0.25	0.1290	1	13.5	.	0.06	0.89	0.50	1.84	0.02	0.07	0.12	.	.	.	.
157	3	07APR80:12:46	0.24	0.1195	1	14.4	.	0.09	0.90	0.64	0.17	0.02	0.04	0.08	.	.	.	.
158	1	14APR80:10:00	0.18	0.0701	1	10.6	.	0.12	1.03	0.80	1.51	0.01	0.04	0.08	.	.	.	.
159	1	21APR80:09:25	0.20	0.0850	1	41.0	.	0.12	1.73	1.29	1.28	0.01	0.06	0.12	.	.	.	.
160	1	12MAY80:12:50	0.19	0.0774	1	19.5	.	0.27	2.30	1.75	0.10	0.01	0.06	0.14	.	.	.	.
161	1	19MAY80:09:50	0.20	0.0850	1	35.0	.	1.60	3.84	1.38	0.83	0.00	0.14	0.24	.	.	.	.
162	1	02JUN80:09:40	0.14	0.0447	1	2.0	.	1.11	2.93	2.33	1.29	0.05	0.11	0.17	.	.	.	.
163	1	09JUN80:12:10	0.08	0.0166	1	17.2	.	1.23	3.04	2.31	0.79	0.02	0.08	0.16	.	.	.	.
164	1	16JUN80:10:10	0.20	0.0850	1	28.0	.	0.88	2.53	1.92	0.54	0.03	0.09	0.20	.	.	.	.

STA=SICR05

ORS	TYPE	TII	STG	FLO	SAMNO	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	T7N	S7N	TPR	SPR
165	1	06AUG79:13:05	0.01	0.0007	1	4.8	.	0.05	1.74	0.87	0.20	0.02	0.06	0.11	0	0	0	0
166	1	27AUG79:10:30	0.02	0.0014	1	2.4	.	0.09	0.81	0.81	0.02	0.01	0.06	0.06	10	10	0	0
167	1	24SEP79:14:15	0.10	0.0248	1	0.4	.	0.05	0.47	0.41	0.19	0.00	0.03	0.04	0	0	0	0
168	1	28JAN80:10:30	0.03	0.0031	1	10.0	.	0.12	.	.	0.69	0.00	.	.	0	0	0	0
169	1	10MAR80:09:35	0.01	0.0007	1	6.0	.	0.72	1.29	1.22	0.91	0.00	0.05	0.05	.	.	.	.
170	1	24MAR80:09:40	0.02	0.0014	1	5.5	.	0.18	0.39	0.39	0.52	0.01	0.05	0.05	.	.	.	.
171	1	07APR80:13:45	0.08	0.0166	1	0.8	.	0.09	0.47	0.42	0.07	0.01	0.04	0.04	.	.	.	.
172	1	14APR80:09:29	0.02	0.0014	1	1.2	.	0.17	0.73	0.56	0.27	0.00	0.02	0.03	.	.	.	.
173	1	05MAY80:14:10	0.04	0.0050	1	2.0	.	0.15	0.59	0.51	0.27	0.00	0.05	0.05	.	.	.	.

APPENDIX A-4

FLOW AND CONCENTRATION DATA FOR BASEFLOW PERIODS

--- STA=SICR07 ---

OBS	TYPE	TII	STG	FLO	SAMNO	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	T7N	S7N	TPR	SPR
174	1	12JUN79:16:55	0.03	0.0133	1.0	3.2	.	0.04	0.25	0.19	0.26	0.00	0.03	0.04	.	.	.	.
175	1	18JUN79:09:00	0.02	0.0055	1.0	2.0	.	0.06	0.25	0.25	0.48	0.00	0.03	0.03	50	40	0	0
176	1	25JUN79:08:40	0.05	0.0401	1.0	2.4	.	0.04	0.43	0.32	0.56	0.00	0.03	0.04	.	.	.	.
177	1	02JUL79:09:50	0.10	0.1790	1.0	3.2	.	0.06	0.60	0.49	0.44	0.00	0.02	0.03	60	60	0	0
178	1	09JUL79:09:30	0.02	0.0055	1.0	2.4	.	0.03	0.30	0.30	0.27	0.00	0.02	0.03	100	70	0	0
179	1	16JUL79:09:15	0.03	0.0133	1.0	1.6	.	0.08	0.60	0.43	0.53	0.00	0.02	0.02	65	50	0	0
180	1	23JUL79:16:40	0.02	0.0055	1.0	2.0	.	0.10	0.59	0.50	0.24	0.00	0.06	0.06	90	50	0	0
181	1	30JUL79:16:15	0.01	0.0012	1.0	3.2	.	0.09	0.60	0.55	0.66	0.00	0.04	0.05	60	60	0	0
182	1	06AUG79:12:40	0.04	0.0248	1.0	8.4	.	0.05	0.37	0.26	0.70	0.01	0.01	0.06	.	.	0	0
183	3	10AUG79:20:15	0.11	0.2200	1.1	247.0	.	0.51	5.58	1.65	1.11	0.01	0.09	1.10	.	.	.	.
184	1	13AUG79:12:30	0.06	0.0595	1.0	2.8	.	0.06	0.43	0.33	0.46	0.02	0.03	0.04	60	50	0	0
185	1	20AUG79:10:45	0.10	0.1790	1.0	1.2	.	0.06	0.40	0.40	0.50	0.01	0.03	0.03	150	170	0	0
186	1	28AUG79:16:35	0.10	0.1790	1.0	5.2	.	0.09	0.76	0.67	0.68	0.02	0.06	0.05	80	60	0	0
187	1	04SEP79:14:00	0.04	0.0248	1.0	1.0	.	0.12	0.44	0.40	0.31	0.01	0.02	0.02	55	50	0	0
188	1	10SEP79:15:35	0.04	0.0248	1.0	3.0	.	0.06	0.32	0.26	0.54	0.01	0.06	0.04	50	50	0	0
189	1	17SEP79:11:35	0.06	0.0595	1.0	3.0	.	0.07	0.28	0.18	0.46	0.00	0.05	0.06	60	60	0	0
190	3	24SEP79:16:40	0.90	18.8000	1.0	5.2	.	0.07	0.39	0.29	0.05	0.00	0.02	0.03	55	55	0	0
191	1	15OCT79:15:50	0.10	0.1790	1.0	2.8	.	0.07	0.25	0.25	0.12	0.00	0.02	0.03	50	45	0	0
192	1	22OCT79:15:00	0.10	0.1790	1.0	30.0	.	0.09	0.54	0.37	0.08	0.00	0.03	0.06	75	70	0	0
193	1	29OCT79:12:40	0.05	0.0401	1.0	31.2	.	0.07	0.24	0.16	0.08	0.00	0.04	0.06	80	45	0	0
194	1	05NOV79:16:50	0.05	0.0401	1.0	8.0	.	0.13	0.14	0.16	0.01	0.00	0.03	0.04	80	65	0	0
195	1	19NOV79:10:45	0.04	0.0248	1.0	17.0	.	0.18	0.41	0.27	0.05	0.01	0.03	0.11	155	65	0	0
196	1	03DEC79:13:30	0.04	0.0248	1.0	2.0	.	0.13	0.23	0.23	0.10	0.01	0.03	0.04	55	45	0	0
197	1	10DEC79:09:00	0.04	0.0248	1.0	11.8	.	0.10	0.49	0.26	0.09	0.00	0.02	0.06	70	40	0	0
198	1	17DEC79:10:50	0.02	0.0055	1.0	10.4	.	0.13	0.42	0.38	0.13	0.00	0.04	0.05	80	60	0	0
199	1	07JAN80:12:30	0.03	0.0133	1.0	26.0	.	0.12	0.81	0.79	0.40	0.01	0.03	0.05	125	80	100	0
200	1	28JAN80:11:35	0.02	0.0055	1.0	4.0	.	0.07	0.30	0.10	0.12	0.00	0.00	0.01	120	30	0	0
201	1	04FEB80:13:55	0.05	0.0401	1.0	2.0	.	0.15	0.30	0.17	0.09	0.00	0.02	0.02	100	65	0	0
202	1	11FEB80:13:00	0.04	0.0248	1.0	18.0	.	0.14	0.28	0.24	0.62	0.00	0.01	0.04	80	55	0	0
203	1	10MAR80:14:00	0.03	0.0133	1.0	1.2	.	0.05	0.28	0.24	0.09	0.00	0.03	0.03	.	.	.	.
204	1	24MAR80:09:30	0.10	0.1790	1.0	1.5	.	0.06	0.40	0.40	0.05	0.01	0.03	0.03	.	.	.	.
205	1	07APR80:14:45	0.07	0.0830	1.0	0.4	.	0.09	0.27	0.25	0.05	0.01	0.02	0.03	.	.	.	.
206	1	21APR80:13:00	0.06	0.0595	1.0	8.0	.	0.06	0.70	0.56	0.11	0.00	0.02	0.04	.	.	.	.
207	1	05MAY80:09:30	0.08	0.1107	1.0	3.6	.	0.25	0.47	0.47	0.11	0.00	0.04	0.04	.	.	.	.
208	1	12MAY80:09:30	0.05	0.0401	1.0	1.5	.	0.13	0.36	0.36	0.14	0.00	0.02	0.03	.	.	.	.
209	1	19MAY80:13:00	0.20	0.7940	1.0	41.0	.	0.07	0.68	0.30	0.07	0.00	0.02	0.10	.	.	.	.
210	1	02JUN80:08:50	0.05	0.0401	1.0	12.5	.	0.07	0.44	0.31	0.05	0.01	0.04	0.05	.	.	.	.
211	1	09JUN80:09:50	0.09	0.1430	1.0	0.2	.	0.11	0.30	0.28	0.09	0.01	0.01	0.02	.	.	.	.
212	1	16JUN80:08:30	0.11	0.2200	1.0	5.6	.	0.10	0.42	0.32	0.36	0.02	0.04	0.06	.	.	.	.
213	1	23JUN80:13:50	0.06	0.0595	1.0	1.6	.	0.04	0.59	0.59	0.27	0.01	0.05	0.07	.	.	.	.
214	1	30JUN80:08:30	0.10	0.1790	1.0	2.8	.	0.21	0.98	0.98	1.46	0.01	0.02	0.03	.	.	.	.
215	1	07JUL80:13:30	0.05	0.0401	1.0	2.4	.	0.06	0.29	0.27	0.11	0.00	0.03	0.03	.	.	.	.
216	1	14JUL80:09:40	0.06	0.0595	1.0	1.6	.	0.06	0.26	0.24	0.15	0.00	0.02	0.02	.	.	.	.
217	1	21JUL80:08:45	0.06	0.0595	1.0	1.2	.	0.06	0.24	0.24	0.13	0.00	0.03	0.04	.	.	.	.
218	1	28JUL80:08:35	0.06	0.0595	1.0	6.4	.	0.02	0.24	0.20	0.04	0.02	0.02	0.03	.	.	.	.
219	1	04AUG80:08:30	0.06	0.0595	1.0	0.8	.	0.08	0.19	0.19	0.12	0.02	0.02	0.03	.	.	.	.
220	1	11AUG80:08:50	0.06	0.0595	1.0	0.8	.	0.08	0.23	0.23	0.11	0.01	0.03	0.04	.	.	.	.
221	1	25AUG80:09:00	.	.	1.0	24.0	10.0	0.06	0.47	0.22	0.12	0.00	0.04	0.06	.	.	.	.
222	1	08SEP80:15:00	0.02	0.0055	1.0	36.0	21.0	0.07	1.47	0.58	0.06	0.01	0.03	0.21	.	.	.	.
223	1	15SEP80:10:35	0.02	0.0021	1.0	13.6	4.8	0.06	0.12	0.06	0.07	0.01	0.01	0.02	.	.	.	.
224	1	22SEP80:15:30	0.02	0.0021	1.0	1.5	11.6	0.14	0.25	0.25	0.03	0.01	0.03	0.03	.	.	.	.
225	3	29SEP80:12:45	0.15	0.0686	1.0	0.0	2.4	0.10	0.20	0.20	0.12	0.01	0.02	0.02	.	.	.	.

APPENDIX A-4

FLOW AND CONCENTRATION DATA FOR BASEFLOW PERIODS

STA=SICR07

OBS	TYPE	TII	STG	FLO	SAMNO	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	T7N	S7N	TPR	SPR
226		08OCT80:10:00	0.02	0.0021		0.0	4.8	0.10	0.24	0.22	0.23	0.02	0.02	0.02	.	.	.	.
227		20OCT80:09:35	0.05	0.0105		1.5	9.1	0.06	0.53	0.53	0.08	0.00	0.00	0.01	.	.	.	.
228		27OCT80:10:20	0.08	0.0236		2.0	8.2	0.07	0.27	0.25	0.25	0.01	0.01	0.01	.	.	.	.
229		03NOV80:08:30	0.06	0.0143		0.5	22.0	0.07	0.19	0.17	0.05	0.00	0.00	0.02	.	.	.	.
230		18NOV80:14:45	0.04	0.0073		1.5	10.0	0.01	0.18	0.18	0.12	0.00	0.03	0.04	.	.	.	.
231		01DEC80:14:45	0.05	0.0105		32.0	25.0	0.16	0.62	0.25	0.22	0.12	1.46	1.46	.	.	.	.
232		08DEC80:08:30	0.02	0.0021		1.0	13.0	0.00	0.12	0.12	0.02	0.01	0.01	0.01	.	.	.	.
233		15DEC80:10:30	0.04	0.0073		0.0	5.2	0.05	0.05	0.05	0.06	0.00	0.00	0.00	.	.	.	.
234		22DEC80:14:25	0.06	0.0143		39.0	7.6	0.08	0.38	0.18	0.06	0.00	0.02	0.10	.	.	.	.
235		26JAN81:14:20	0.02	0.0021		1.0	10.4	0.05	0.49	0.31	0.41	0.04	0.04	0.04	.	.	.	.
236		09FEB81:13:50	0.06	0.0143		2.4	8.6	0.09	0.35	0.35	0.31	0.01	.	.	.	.	.	.
237		09MAR81:14:15	0.08	0.0236		0.5	.	0.09	0.33	0.33	0.16	0.00	0.00	0.00	.	.	.	.
238		23MAR81:14:05	0.07	0.0186		0.5	.	0.05	.	.	0.05	0.01	.	.	.	.	.	.
239		06APR81:16:00	0.07	0.0186		1.0	.	0.08	0.48	0.48	0.13	0.02	0.03	0.04	.	.	.	.
240		20APR81:14:40	0.03	0.0045		1.0	.	0.07	0.31	.	0.08	0.01	0.03	0.03	.	.	.	.
241		27APR81:14:35	0.07	0.0186		1.0	.	0.09	0.37	0.33	0.05	0.02	0.02	0.02	.	.	.	.
242		04MAY81:14:30	0.07	0.0186		1.0	.	0.07	0.24	0.24	0.01	0.00	0.02	0.02	.	.	.	.
243		18MAY81:13:45	0.07	0.0186		2.0	.	0.08	0.30	0.30	0.07	0.01	0.02	0.02	.	.	.	.

STA=SICR08

OBS	TYPE	TII	STG	FLO	SAMNO	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	T7N	S7N	TPR	SPR
244		12JUN79:17:10	0.08	0.1135		12.0	.	0.16	0.32	0.28	0.06	0.00	0.03	0.05	.	.	.	.
245		18JUN79:09:30	0.10	0.1831		14.4	.	0.16	0.27	0.27	0.22	0.00	0.03	0.04	60	60	0	0
246		25JUN79:09:10	.	.		28.6	.	0.16	0.51	0.32	0.21	0.00	0.03	0.06	.	.	.	.
247		02JUL79:09:30	0.10	0.1831		8.4	.	0.12	0.90	0.77	0.24	0.00	0.02	0.04	50	50	0	0
248		09JUL79:09:15	0.06	0.0611		138.0	.	0.19	0.38	0.25	0.18	0.00	0.03	0.08	50	0	0	0
249		16JUL79:09:30	0.08	0.1135		30.0	.	0.28	0.79	0.58	0.13	0.00	0.02	0.06	70	0	0	0
250		23JUL79:16:50	0.03	0.0137		28.0	.	0.32	0.67	0.63	0.05	0.00	0.03	0.06	0	0	0	0
251		30JUL79:16:30	0.01	0.0013		36.0	.	0.19	1.57	0.72	0.66	0.01	0.04	0.16	.	.	0	0
252		06AUG79:13:00	0.06	0.0611		13.6	.	0.23	0.56	0.49	0.05	0.01	0.01	0.04	.	.	.	.
253		13AUG79:13:05	0.10	0.1831		1.2	.	0.10	0.37	0.35	0.19	0.02	0.02	0.03	20	20	0	0
254		20AUG79:11:10	0.08	0.1135		4.4	.	0.20	0.65	0.65	0.12	0.00	0.03	0.04	60	60	0	0
255		27AUG79:16:35	0.15	0.4352		14.8	.	0.11	1.06	0.99	0.80	0.01	0.03	0.05	70	70	0	0
256		04SEP79:14:55	0.04	0.0255		17.0	.	0.24	0.86	0.86	0.19	0.01	0.03	0.05	0	0	0	0
257		10SEP79:16:00	0.09	0.1461		21.0	.	0.11	0.69	0.46	0.22	0.00	0.02	0.05	40	40	0	0
258		17SEP79:11:25	0.05	0.0412		9.0	.	0.17	0.38	0.18	0.11	0.00	0.05	0.06	0	0	0	0
259		24SEP79:17:00	1.20	28.6445		56.0	.	0.09	0.45	0.30	0.05	0.00	0.02	0.06	25	25	0	0
260		15OCT79:16:00	0.10	0.1831		2.8	.	0.07	0.21	0.21	0.07	0.00	0.02	0.03	35	15	0	0
261		22OCT79:15:15	0.13	0.3208		8.8	.	0.05	0.22	0.20	0.00	0.00	0.01	0.03	30	10	0	0
262		29OCT79:13:00	0.15	0.4352		18.8	.	0.07	0.22	0.16	0.06	0.01	0.03	0.05	30	10	0	0
263		05NOV79:17:00	0.10	0.1831		7.6	.	0.13	0.28	0.14	0.00	0.00	0.03	0.04	20	20	0	0
264		19NOV79:11:00	0.08	0.1135		34.0	.	0.15	0.35	0.21	0.03	0.00	0.03	0.06	45	25	0	0
265		03DEC79:13:40	0.07	0.0852		13.0	.	0.11	0.27	0.17	0.06	0.01	0.02	0.04	25	25	0	0
266		10DEC79:09:15	0.07	0.0852		5.8	.	0.12	0.36	0.26	0.07	0.00	0.03	0.04	20	15	0	0
267		17DEC79:11:00	0.03	0.0137		36.0	.	0.11	0.50	0.38	0.15	0.01	0.04	0.07	15	15	0	0
268		07JAN80:11:45	0.03	0.0137		61.0	.	0.26	0.96	0.60	0.26	0.00	0.03	0.05	50	45	0	0
269		28JAN80:11:40	0.12	0.2704		24.0	.	0.08	0.55	0.28	0.08	0.00	0.00	0.03	25	20	0	0
270		04FEB80:14:00	0.10	0.1831		1.2	.	0.10	0.34	0.30	0.11	0.00	0.02	0.03	40	35	0	0
271		11FEB80:13:05	0.15	0.4352		8.8	.	0.14	0.22	0.19	0.44	0.00	0.00	0.01	35	15	0	0

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                                              APPENDIX A-4
                               FLOW AND CONCENTRATION DATA FOR BASEFLOW PERIODS
------------------------------------------------------ STA=51CR08 ------------------------------------------------------
 OBS  TYPE      TII          STG   FLO     SAMNO   TSS   COD   NH3   TKN   SKN   NO23  OP    TSP   TP    TZN STN TPR SPR

 272   1   10MAR80:14:15   0.10  0.1831    1       6.4    .   0.05  0.34  0.26  0.07  0.00  0.02  0.03   .   .   .   .
 273   1   24MAR80:09:50   0.18  0.4410    1      10.0    .   0.08  0.43  0.43  0.05  0.01  0.03  0.05   .   .   .   .
 274   1   07APR80:15:00   0.17   .        1       4.4    .   0.11  0.25  0.20  0.05  0.01  0.02  0.02   .   .   .   .
 275   1   21APR80:13:15   0.18  0.0820    1       3.2    .   0.06  0.56  0.47  0.05  0.00  0.02  0.03   .   .   .   .
 276   1   05MAY80:10:00   0.21  0.1081    1      14.8    .   0.27  0.53  0.44  0.05  0.00  0.06  0.07   .   .   .   .
 277   1   12MAY80:10:00   0.10  0.0298    1       8.0    .   0.15  0.44  0.44  0.08  0.00  0.02  0.06   .   .   .   .
 278   1   19MAY80:13:15   0.19  0.0903    1      82.0    .   0.15  0.50  0.39  0.03  0.00  0.02  0.06   .   .   .   .
 279   1   02JUN80:09:10   0.12  0.0406    1      11.4    .   0.27  0.61  0.48  0.01  0.01  0.04  0.05   .   .   .   .
 280   1   09JUN80:10:00   0.15  0.0595    1      19.0    .   0.21  0.49  0.36  0.01  0.01  0.01  0.06   .   .   .   .
 281   1   16JUN80:08:50   0.21  0.1081    1       8.0    .   0.18  0.48  0.42  0.22  0.02  0.04  0.06   .   .   .   .
 282   1   23JUN80:14:00   0.14  0.0528    1      12.0    .   0.28  0.86  0.74  0.03  0.02  0.05  0.09   .   .   .   .
 283   1   30JUN80:09:00   0.19  0.0903    1      12.0    .   0.23  0.73  0.70  0.70  0.00  0.00  0.02   .   .   .   .
 284   1   07JUL80:13:40   0.08  0.0200    1      12.4    .   0.35  0.56  0.49  0.03  0.01  0.04  0.08   .   .   .   .
 285   1   14JUL80:09:45   0.11  0.0350    1      11.0    .   0.31  0.51  0.46  0.05  0.00  0.02  0.06   .   .   .   .
 286   1   21JUL80:08:50   0.10  0.0298    1      22.4    .   0.37  0.61  0.51  0.05  0.00  0.03  0.08   .   .   .   .
 287   1   28JUL80:08:55   0.08  0.0200    1      40.0    .   0.28  0.62  0.44  0.02  0.01  0.02  0.10   .   .   .   .
 288   1   04AUG80:09:10   0.07  0.0158    1       2.4    .   0.27  0.43  0.43  0.00  0.02  0.03  0.06   .   .   .   .
 289   1   11AUG80:09:10   0.09  0.0247    1      14.0    .   0.36  0.63  0.55  0.05  0.02  0.03  0.05   .   .   .   .
 290   1   25AUG80:09:00    .     .        1      18.0  11.4  0.46  0.83  0.71  0.06  0.00  0.04  0.06   .   .   .   .
 291   1   08SEP80:15:05   0.04  0.0061    1      34.0  15.4  1.05  1.74  1.55  0.12  0.00  0.02  0.05   .   .   .   .
 292   1   29SEP80:13:00   0.05  0.0089    1     144.0  25.4  0.36  1.16  0.89  0.28  0.02  0.05  0.16   .   .   .   .
 293   1   06OCT80:10:10   0.01  0.0009    1       3.0   7.6  0.12   .     .    0.11  0.01  0.04  0.04   .   .   .   .
 294   1   20OCT80:10:50   0.02  0.0018    1      10.0  91.3  0.05  0.27  0.25  0.05  0.01  0.01  0.04   .   .   .   .
 295   1   27OCT80:10:35   0.05  0.0089    1       2.0  10.0  0.07  0.31  0.29  0.07  0.02  0.02  0.03   .   .   .   .
 296   1   03NOV80:08:30   0.05  0.0089    1       1.5   6.0  0.04  0.21  0.21  0.07  0.01  0.01  0.02   .   .   .   .
 297   1   10NOV80:14:50   0.03  0.0038    1       2.5  18.0  0.00  0.31  0.29  0.06  0.04  0.02  0.09   .   .   .   .
 298   1   01DEC80:14:50   0.07  0.0158    1       0.0   9.9  0.05  0.15  0.15  0.08  0.01  0.01  0.01   .   .   .   .
 299   1   08DEC80:08:30   0.05  0.0089    1       3.0  13.8  0.05  0.07  0.07  0.06  0.01  0.01  0.01   .   .   .   .
 300   1   15DEC80:10:30   0.02  0.0018    1       6.0   6.8  0.02  0.11  0.11  0.08  0.01  0.01  0.01   .   .   .   .
 301   1   22DEC80:13:50   0.02  0.0018    1       7.0   6.4  0.08  0.12  0.12  0.06  0.00  0.01  0.02   .   .   .   .
 302   1   26JAN81:14:20   0.02  0.0018    1      11.0  12.8  0.07  0.56  0.49  0.17  0.05  0.05  0.06   .   .   .   .
 303   1   09FEB81:13:50   0.06  0.0121    1       9.6  13.9  0.09  0.45  0.45  0.45  0.02   .     .     .   .   .   .
 304   1   09MAR81:14:15   0.11  0.0350    1       0.5    .   0.07  0.39  0.35  0.12  0.00  0.00  0.00   .   .   .   .
 305   1   23MAR81:14:05   0.08  0.0200    1       0.5    .   0.05   .     .    0.05  0.01   .     .     .   .   .   .
 306   1   06APR81:16:00   0.08  0.0200    1       2.0    .   0.09  0.50  0.50  0.11  0.01  0.02  0.03   .   .   .   .
 307   1   20APR81:14:45   0.08  0.0200    1       2.0    .   0.05  0.53  0.38  0.08  0.01  0.03  0.05   .   .   .   .
 308   1   27APR81:14:35   0.07  0.0158    1       7.0    .   0.07  0.47  0.35  0.07  0.02  0.02  0.06   .   .   .   .
 309   1   04MAY81:14:33   0.06  0.0121    1       4.0    .   0.15  0.55  0.45  0.00  0.00  0.02  0.06   .   .   .   .
 310   1   18MAY81:13:45   0.06  0.0121    1       4.0    .   0.16  0.23  0.21  0.09  0.01  0.02  0.02   .   .   .   .

------------------------------------------------------ STA=51CR09 ------------------------------------------------------
 OBS  TYPE      TII          STG   FLO     SAMNO   TSS   COD   NH3   TKN   SKN   NO23  OP    TSP   TP    TZN STN TPR SPR

 311   1   02JUL79:10:45   0.12  0.0341    1      24.4    .   0.02  0.40  0.28  0.13  0.00  0.02  0.06   0   0   0   0
 312   1   09JUL79:12:20   0.02  0.0014    1      15.2    .   0.01  0.38  0.28  0.14  0.01  0.03  0.08   0   0   0   0
 313   1   16JUL79:09:30   0.06  0.0100    1      21.4    .   0.03  0.39  0.24  0.09  0.01  0.02  0.06   0   0   0   0
 314   1   23JUL79:13:10   0.01  0.0007    1      12.0    .   0.06  0.54  0.46  0.07  0.01  0.05  0.06   0   0   0   0
 315   1   30JUL79:14:00   0.06  0.0100    1      30.0    .   0.05  0.51  0.39  0.08  0.01  0.05  0.10   0   0   0   0
 316   1   06AUG79:11:05   0.01  0.0007    1      14.8    .   0.03  0.16  0.09  0.09  0.01  0.02  0.04   0   0   0   0
 317   1   13AUG79:13:35   0.05  0.0073    1      26.0    .    .    0.25  0.15  0.15  0.02  0.02  0.06   0   0   0   0
```

APPENDIX A-4

FLOW AND CONCENTRATION DATA FOR BASEFLOW PERIODS

--- STA=51CR09 ---

OBS	TYPE	TII	STG	FLO	SAMNO	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	TZN	SZN	TPR	SPR
318	1	20AUG79:10:25	0.01	0.0007	1	36.0	.	0.06	0.48	0.27	0.12	0.01	0.03	0.08	50	30	0	0
319	1	27AUG79:09:40	0.18	0.0701	1	35.0	.	0.05	0.44	0.26	0.06	0.01	0.03	0.07	10	0	0	0
320	1	06SEP79:10:55	0.22	0.1015	1	49.0	.	0.10	0.51	0.21	0.23	0.01	0.03	0.08	10	10	0	0
321	1	10SEP79:10:45	0.30	0.1830	1	19.0	.	0.06	0.17	0.17	0.09	0.02	0.03	0.03	20	20	0	0
322	1	17SEP79:16:25	0.12	0.0341	1	12.0	.	0.05	0.17	0.10	0.03	0.01	0.06	0.09	75	75	0	0
323	1	26SEP79:11:45	0.47	0.3560	1	15.6	.	0.03	0.30	0.22	0.01	0.00	0.03	0.04	0	0	0	0
324	1	15OCT79:16:00	.	.	1	19.6	.	0.03	0.23	0.17	0.03	0.00	0.03	0.05	20	15	0	0
325	1	22OCT79:12:15	0.22	0.1015	1	8.0	.	0.02	0.15	.	0.00	0.00	0.02	0.03	10	0	0	0
326	1	29OCT79:10:15	0.19	0.0774	1	7.0	.	0.05	0.17	0.08	0.08	0.01	0.04	0.05	0	0	0	0
327	1	05NOV79:10:10	0.13	0.0392	1	13.6	.	0.07	0.10	0.07	0.00	0.00	0.04	0.05	10	10	0	0
328	1	19NOV79:13:00	0.20	0.0850	1	8.0	.	0.11	0.12	0.12	0.05	0.01	0.03	0.04	0	0	0	0
329	1	03DEC79:12:15	0.19	0.0774	1	74.0	.	0.09	0.41	0.13	0.02	0.01	0.03	0.14	20	10	0	0
330	1	10DEC79:12:45	0.18	0.0701	1	6.4	.	0.06	0.53	0.21	0.05	0.01	0.03	0.03	0	0	0	0
331	1	17DEC79:13:00	0.15	0.0505	1	2.8	.	0.05	0.17	0.17	0.09	0.00	0.03	0.04	0	0	0	0
332	1	07JAN80:12:00	0.11	0.0293	1	20.4	.	0.06	0.30	0.19	0.17	0.01	0.03	0.04	0	0	0	0
333	3	28JAN80:09:00	0.24	0.1290	1	2.8	.	0.06	0.64	0.64	0.08	0.00	0.01	0.03	0	0	0	0
334	1	04FEB80:10:35	0.16	0.0567	1	23.0	.	.	0.22	0.17	0.11	0.00	0.03	0.07	0	0	0	0
335	1	11FEB80:11:30	0.16	0.0567	1	8.8	.	0.04	0.13	0.06	0.16	0.01	0.01	0.01	0	0	0	0
336	1	10MAR80:11:50	0.15	0.0505	1	9.2	.	0.05	0.43	0.26	0.11	0.00	0.05	0.06	.	.	.	.
337	3	24MAR80:12:30	0.38	0.2910	1	10.5	.	0.03	0.33	0.33	0.10	0.02	0.03	0.04	.	.	.	.
338	3	07APR80:15:20	0.36	0.2620	1	16.0	.	0.09	0.18	0.14	0.07	0.01	0.02	0.04	.	.	.	.
339	3	14APR80:11:20	0.36	0.2620	1	45.0	.	0.04	0.39	0.27	0.12	0.01	0.02	0.07	.	.	.	.
340	1	21APR80:10:55	0.32	0.2070	1	16.0	.	0.08	0.41	0.41	0.03	0.00	0.02	0.04	.	.	.	.
341	1	05MAY80:13:30	0.30	0.1830	1	14.4	.	0.07	0.30	0.17	0.05	0.00	0.06	0.06	.	.	.	.
342	1	12MAY80:10:15	0.28	0.1602	1	15.5	.	0.05	0.15	0.10	0.08	0.02	0.02	0.05	.	.	.	.
343	1	19MAY80:11:00	0.19	0.0774	1	7.0	.	0.03	0.35	0.21	0.06	0.00	0.02	0.07	.	.	.	.
344	1	02JUN80:11:30	0.21	0.0930	1	28.0	.	0.05	0.29	0.17	0.06	0.02	0.03	0.07	.	.	.	.
345	1	09JUN80:14:25	0.14	0.0447	1	45.0	.	0.06	0.30	0.16	0.01	0.01	0.01	0.07	.	.	.	.
346	1	16JUN80:11:45	0.18	0.0701	1	18.4	.	0.07	0.32	0.26	0.08	0.01	0.02	0.04	.	.	.	.
347	1	23JUN80:12:15	0.09	0.0204	1	18.4	.	0.06	0.61	0.45	0.06	0.01	0.02	0.06	.	.	.	.
348	1	30JUN80:12:05	0.08	0.0166	1	18.8	.	0.03	0.57	0.44	0.07	0.01	0.03	0.06	.	.	.	.
349	1	07JUL80:11:50	0.05	0.0073	1	19.2	.	0.04	0.21	0.71	0.13	0.01	0.04	0.05	.	.	.	.
350	1	14JUL80:14:25	0.02	0.0014	1	16.8	.	0.03	0.18	0.14	0.17	0.01	0.03	0.06	.	.	.	.
351	1	21JUL80:13:50	0.03	0.0031	1	13.4	.	0.02	0.20	0.18	0.17	0.02	0.04	0.11	.	.	.	.
352	1	28JUL80:13:10	0.04	0.0050	1	68.0	.	0.04	0.42	0.18	0.16	0.02	0.03	0.04	.	.	.	.
353	1	04AUG80:13:30	0.02	0.0014	1	15.2	.	0.05	0.15	0.09	0.18	0.01	0.02	0.07	.	.	.	.
354	1	11AUG80:13:00	0.02	0.0014	1	14.4	.	0.06	0.29	0.19	0.11	0.01	0.04	0.03	.	.	.	.
355	1	01DEC80:10:00	0.03	0.0031	1	7.0	.	0.08	0.45	0.19	0.06	0.01	0.02	0.00	.	.	.	.
356	1	02MAR81:09:50	0.07	0.0130	1	8.8	.	0.08	0.24	0.23	0.09	0.00	0.00	0.01	.	.	.	.
357	1	09MAR81:11:10	0.06	0.0108	1	8.0	.	0.05	0.15	0.14	0.19	0.00	0.01	0.01	.	.	.	.
358	1	23MAR81:11:30	0.01	0.0007	1	0.8	.	0.03	.	.	0.09	0.02	.	.	.	.	.	.
359	1	06APR81:12:55	0.02	0.0014	1	0.5	.	0.05	0.10	0.10	0.05	0.01	0.01	0.01	.	.	.	.
360	1	20APR81:11:35	0.05	0.0073	1	1.0	.	0.01	0.25	0.25	0.04	0.01	0.04	0.04	.	.	.	.
361	1	27APR81:12:05	0.03	0.0031	1	1.0	.	0.03	0.26	0.26	0.05	0.01	0.02	0.02	.	.	.	.
362	1	04MAY81:11:05	0.05	0.0073	1	0.0	.	0.07	0.32	0.32	0.09	0.02	0.03	0.03	.	.	.	.
363	1	18MAY81:12:17	0.05	0.0073	1	7.0	.	0.07	0.06	0.06	0.15	.	0.02	0.03	.	.	.	.

Appendix B-1

Variable Code Names
Precipitation Data

STA	Station number (51CBXX)
TIME1	Date and time precipitation began (DDMMYY)--Datetime13 format
TIME2	Date and time precipitation ended
STRMNO	Storm number (day of year.storm sequence number)
PRECIP	Precipitation (inches)
DPKRUN	Descriptor for PKRUN: G = greater than L = less than
PKRUN	Peak runoff flow (cfs)
ANTDRY	Antecedent dry period (hours)
ALTSTA	Precipitation record taken from alternate station (51OL01 = Occoquan Lab in Manassas)
DPRECIP	Snow (S) or Rain (R)

APPENDIX B-1

PRECIPITATION DATA

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------------------------------------------------- STA=51CR01 --------------------------------------------------------------

 OBS        TIME1              TIME2         STPHNO    PRECIP    DPKRUN    PKRUN     ANTDRY    ALTSTA    DPRECIP

   1          .                  .            231.0     0.54               0.099        .      51OLA1
   2   15MAY79:19:20     15MAY79:20:20          .       0.28                 .          .
   3   18MAY79:22:05     19MAY79:06:15          .       0.27                 .        73.75
   4   21MAY79:13:12     21MAY79:14:12          .       0.05                 .        62.60
   5   23MAY79:00:00     23MAY79:04:45        143.0     0.55               0.418      39.33
   6   23MAY79:05:25     24MAY79:04:05        143.1     0.66               0.611       0.75
   7   25MAY79:02:50     25MAY79:04:40        145.0     0.44               0.875      23.25
   8   25MAY79:13:45     25MAY79:14:30        145.1     0.45               0.916       9.00
   9   25MAY79:19:00     25MAY79:19:15          .       0.21                 .         4.50
  10   28MAY79:06:00     28MAY79:06:35          .       0.12                 .        58.75
  11   31MAY79:20:48     01JUN79:01:10        151.0     2.15       G       1.130      86.25
  12   03JUN79:00:25     03JUN79:22:15          .       1.89                 .        59.25
  13   04JUN79:01:05     04JUN79:04:10          .       0.14                 .         3.00
  14   10JUN79:19:30     10JUN79:21:40          .       0.29                 .       160.33
  15   11JUN79:05:00     11JUN79:09:50          .       0.17                 .         7.33
  16   17JUN79:03:50     17JUN79:12:15        168.0     0.85               1.700     137.00
  17   23JUN79:23:20     24JUN79:00:45          .       0.20                 .       152.00
  18   30JUN79:16:00     30JUN79:16:15        181.0     0.57               0.520     159.25    51OLA1
  19   01JUL79:16:15     01JUL79:17:45        182.0     0.21               0.818      24.00    51OLA1
  20   02JUL79:01:15     02JUL79:06:15          .       0.04                 .        26.25
  21   04JUL79:02:45     04JUL79:05:05          .       0.45                 .        49.00
  22   13JUL79:20:00     13JUL79:21:14          .       0.38                 .       231.00
  23   14JUL79:10:25     14JUL79:12:10          .       0.22                 .        13.00
  24   21JUL79:08:00     21JUL79:10:00          .       0.94                 .       164.00
  25   22JUL79:22:35     22JUL79:22:38          .       0.05                 .        38.50
  26   23JUL79:16:15     23JUL79:16:40        204.0     0.74               1.060      17.50
  27   25JUL79:15:55     25JUL79:16:35          .       0.05                 .        47.33
  28   28JUL79:15:00     28JUL79:15:25        209.0     0.50               2.410      70.50
  29   29JUL79:20:15     30JUL79:03:15          .       0.93                 .        29.33
  30   02AUG79:15:35     02AUG79:17:40          .       1.03                 .        84.75    51OLA1
  31   11AUG79:16:15     11AUG79:16:30        223.0       .                0.363        .      51OLA1
  32   11AUG79:18:15     12AUG79:15:00          .       1.55                 .         1.75    51OLA1
  33   18AUG79:10:33     18AUG79:14:37          .       0.15                 .       139.50
  34   21AUG79:01:00     21AUG79:02:28          .       0.39                 .          .
  35   21AUG79:08:40     21AUG79:11:08          .       0.40                 .         6.25
  36   23AUG79:15:22     23AUG79:17:30        235.0     0.50       L       0.209      52.00
  37   25AUG79:16:00     25AUG79:20:30          .       0.70                 .        46.00
  38   27AUG79:15:25     27AUG79:19:50          .       0.63                 .        43.50
  39   30AUG79:03:35     30AUG79:04:00          .       0.05                 .        55.50
  40   03SEP79:02:10     03SEP79:03:05          .       0.13                 .        70.00
  41   03SEP79:17:40     04SEP79:00:40          .       0.37                 .        17.50
  42   05SEP79:11:10     06SEP79:01:10        248.0     3.25               4.290      34.00
  43   14SEP79:02:15     14SEP79:02:40          .       0.07                 .       193.00
  44   14SEP79:15:40     14SEP79:15:55          .       0.14                 .        13.00
  45   21SEP79:05:34     21SEP79:13:41          .       0.71                 .       157.66
  46   21SEP79:14:22     22SEP79:01:17        264.0     2.66       G      14.100       0.66
  47   22SEP79:15:25     22SEP79:20:35          .       0.19                 .        14.00
  48   28SEP79:12:50     28SEP79:14:25          .       0.12                 .       136.50
  49   30SEP79:13:30     01OCT79:07:30          .       2.20                 .        47.00    51OLA1
  50   02OCT79:20:40     02OCT79:23:30          .       0.40                 .        37.00
  51   05OCT79:07:30     05OCT79:13:10          .       1.07                 .        56.00
  52   09OCT79:06:10     09OCT79:12:50          .       0.65                 .        89.00
```

APPENDIX B-1
PRECIPITATION DATA

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------------------------------------------------------- STA=51CA01 -------------------------------------------------------

 OBS      TIME1             TIME2          STRMNO   PRECIP   DPKRUN   PKRUN    ANTDRY   ALTSTA   DPRECIP

  53   11OCT79:08:15   11OCT79:10:15      .       0.07              .        43.25
  54   23OCT79:03:55   23OCT79:06:33      .       0.36              .       281.66
  55   08NOV79:23:25   09NOV79:00:55      .       0.04              .          .
  56   10NOV79:03:32   10NOV79:14:35      .       0.50              .        26.50
  57   15NOV79:04:12   15NOV79:11:30      .       0.13              .       109.75
  58   13DEC79:01:25   13DEC79:15:45      .       0.56              .          .
  59   23DEC79:15:52   24DEC79:01:00      .       0.08              .       240.00
  60   24DEC79:09:55   24DEC79:16:25      .       0.32              .         9.00
  61   06JAN80:08:50   06JAN80:11:05      .       0.13              .          .                 SR
  62   14JAN80:11:35   15JAN80:03:06     14       0.47           0.3630       .
  63   18JAN80:05:51   18JAN80:20:28     18       1.11           0.2960     74.75
  64   22JAN80:14:55   22JAN80:18:28      .       0.10              .        90.50                 SR
  65   25JAN80:10:05   25JAN80:10:35      .       0.02              .        63.50                 SR
  66   31JAN80:12:32   31JAN80:13:54      .       0.04              .       146.00
  67   07FEB80:09:20   07FEB80:10:00      .       0.04              .       163.33                 S
  68   10FEB80:06:32   10FEB80:09:27      .       0.10              .        68.50                 S
  69   16FEB80:05:04   16FEB80:09:09      .       0.05              .       139.50
  70   20FEB80:21:44   20FEB80:22:53      .       0.04              .       108.75
  71   22FEB80:02:40   22FEB80:05:01      .       0.25              .        27.66
  72   23FEB80:23:02   24FEB80:00:30      .       0.05              .        42.00
  73   25FEB80:03:08   25FEB80:08:43      .       0.13              .        26.50
  74   28FEB80:12:10   28FEB80:15:11      .       0.06              .        75.25                 S
  75   04MAR80:23:44   05MAR80:09:08      .       0.17              .          .                 SR
  76   13MAR80:17:09   13MAR80:20:18     73       0.40           0.2360    200.00                 SR
  77   14MAR80:10:10   14MAR80:17:04      .       0.73              .        13.75                 SR
  78   17MAR80:08:23   17MAR80:13:58      .       0.19              .        63.50
  79   21MAR80:05:03   22MAR80:00:36     81       1.08      G    1.1900     87.00
  80   24MAR80:06:52   24MAR80:07:08      .       0.02              .        54.50
  81   24MAR80:19:52   24MAR80:21:04      .       0.10              .        13.00
  82   28MAR80:16:39   29MAR80:05:46      .       0.80              .        91.66
  83   30MAR80:22:32   31MAR80:06:36      .       0.48              .        40.75
  84   31MAR80:12:59   31MAR80:16:47      .       0.17              .         6.50
  85   07APR80:01:07   07APR80:01:58      .       0.15              .          .
  86   07APR80:17:00   07APR80:20:09      .       0.06              .        15.00
  87   09APR80:03:06   09APR80:10:47      .       0.68              .        31.25
  88   14APR80:10:40   14APR80:13:34      .       0.50              .       120.00
  89   24APR80:17:14   24APR80:18:15      .       0.22              .          .
  90   26APR80:09:10   26APR80:15:52      .       0.43              .        38.75
  91   26APR80:17:53   27APR80:04:15      .       0.38              .         2.00
  92   27APR80:15:02   27APR80:18:34      .       0.32              .        10.75
  93   28APR80:04:29   28APR80:08:25      .       0.19              .        10.00
  94   28APR80:12:17   28APR80:19:13      .       0.48              .         3.75
  95   11MAY80:12:20   11MAY80:14:12      .       0.09              .          .
  96   12MAY80:19:11   12MAY80:19:52      .       0.52              .        29.00
  97   19MAY80:19:16   19MAY80:20:57    140       0.40           0.3120       .
  98   20MAY80:16:43   21MAY80:07:24      .       0.93              .        19.75
  99   07JUN80:17:39   07JUN80:17:45      .       0.03              .          .
 100   15JUN80:16:26   15JUN80:17:25      .       0.63              .          .      51CA02
 101   16JUN80:04:21   16JUN80:05:25      .       0.16              .        11.00    51CA02
 102   03JUL80:14:15   03JUL80:16:00    185       0.64              .          .      51CA02
 103   08JUL80:07:48   08JUL80:11:13      .       0.87           0.0741       .
 104   17JUL80:16:21   17JUL80:16:29      .       0.14              .          .
```

APPENDIX B-1

PRECIPITATION DATA

```
------------------------------------------------- STA=SICR01 -------------------------------------------------

OBS      TIME1            TIME2          STRMNO    PRECIP    DPKRUN    PKRUN    ANTDRY    ALTSTA    DPRECIP

105   21JUL80:18:42   21JUL80:18:55        .        0.23                 .       98.25
106   22JUL80:14:26   22JUL80:14:34        .        0.07                 .       19.50
107   22JUL80:17:10   23JUL80:02:43        .        0.48                 .        2.50
108   23JUL80:09:01   23JUL80:10:30        .        0.10                 .        6.25
109   28JUL80:22:30   28JUL80:23:52        .        0.02                 .      132.00
110   01AUG80:13:43   01AUG80:13:58      214        0.46             0.196       85.75
111   03AUG80:18:26   03AUG80:22:02        .        0.12                 .       52.50
112   05AUG80:16:51   05AUG80:17:47        .        0.05                 .       42.75
113   10AUG80:22:22   11AUG80:00:33        .        0.53                 .      124.50
114   11AUG80:17:14   11AUG80:17:24        .        0.10                 .       16.75
115   15AUG80:19:03   15AUG80:20:15        .        0.17                 .       97.66
116   18AUG80:04:44   18AUG80:07:44        .        0.50                 .       56.50
117   29AUG80:18:04   29AUG80:18:10        .        0.02                 .           .
118   10SEP80:02:30   10SEP80:03:31        .        0.09                 .           .
119   10SEP80:06:42   10SEP80:06:43        .        0.01                 .        3.25
120   17SEP80:22:38   17SEP80:23:09      261        0.62             0.763           .    SICR02
121   21SEP80:18:08   21SEP80:18:19        .        0.09                 .           .
122   22SEP80:18:02   22SEP80:18:07        .        0.02                 .       23.25
123   25SEP80:00:45   25SEP80:08:13      269        1.05             0.296       54.66
124   02OCT80:17:13   03OCT80:00:49        .        0.16                 .      177.00    SICR05
125   18OCT80:15:23   18OCT80:20:56        .        0.30                 .      374.50
126   25OCT80:00:19   25OCT80:11:09      299        1.68             0.328      147.33
127   25OCT80:13:29   25OCT80:16:20        .        0.10                 .        2.33
128   28OCT80:16:43   28OCT80:16:44        .        0.01                 .       72.33
129   04NOV80:07:19   04NOV80:11:38        .        0.27                 .           .    SICR05
130   09NOV80:15:29   09NOV80:15:54        .        0.05                 .      124.00
131   10NOV80:14:40   10NOV80:14:41        .        0.01                 .       22.75
132   14NOV80:22:48   14NOV80:23:28        .        0.02                 .      104.00
133   15NOV80:23:13   16NOV80:03:25        .        0.06                 .       23.75
134   17NOV80:12:37   18NOV80:08:19        .        1.06                 .       33.25
135   24NOV80:00:51   24NOV80:14:55      329        1.23             0.236      136.50
136   27NOV80:15:50   27NOV80:22:34        .        0.24                 .       73.00
137   02DEC80:18:35   02DEC80:19:08        .        0.13                 .      116.00
138   09DEC80:12:10   09DEC80:14:23        .        0.12                 .      161.00
139   16DEC80:08:44   16DEC80:08:45        .        0.01                 .      162.33
140   23DEC80:10:27   23DEC80:11:45        .        0.13                 .      169.75              SR
141   15JAN81:13:03   15JAN81:13:51        .        0.04                 .           .
142   16JAN81:18:31   16JAN81:19:57        .        0.02                 .       28.66
143   21JAN81:01:19   21JAN81:10:55        .        0.15                 .      173.33              SR
144   02FEB81:03:29   02FEB81:10:24        .        0.99                 .      280.50
145   08FEB81:02:01   08FEB81:13:27        .        0.21                 .      135.66
146   10FEB81:23:10   11FEB81:12:49       42        0.96             9.340       57.75
147   19FEB81:13:55   20FEB81:02:20        .        0.61                 .           .
148   20FEB81:11:43   20FEB81:13:07        .        0.07                 .        9.33
149   20FEB81:22:45   21FEB81:01:25        .        0.12                 .        9.66
150   22FEB81:08:16   22FEB81:09:59        .        0.05                 .       30.50
151   22FEB81:18:49   23FEB81:16:02        .        0.80                 .        9.00
152   04MAR81:19:06   05MAR81:11:54        .        0.41                 .      219.00
153   16MAR81:11:39   16MAR81:14:27        .        0.12                 .      263.75
154   30MAR81:06:45   30MAR81:15:52        .        0.18                 .      328.33
155   01APR81:15:28   01APR81:16:30        .        0.13                 .       47.50
156   04APR81:13:54   04APR81:13:55        .        0.01                 .       69.50
```

APPENDIX B-1

PRECIPITATION DATA

```
--------------------------------------------------------- STA=51CR01 ---------------------------------------------------------

  OBS        TIME1              TIME2          STRMNO     PRECIP    DPKRUN    PKRUN     ANTDRY    ALTSTA    DPRECIP

  157    05APR81:08:22     05APR81:18:04         .         0.26                 .        10.50
  158    09APR81:08:57     09APR81:12:17         .         0.29                 .        87.00
  159    11APR81:09:25     11APR81:10:15         .         0.09                 .        45.33
  160    12APR81:17:23     13APR81:03:56       102.0       0.57               0.099        .
  161    14APR81:04:06     14APR81:06:03         .         0.09                 .        25.00
  162    14APR81:16:54     14APR81:17:46         .         0.06                 .        10.75
  163    17APR81:06:32     17APR81:11:37         .         0.12                 .        60.75
  164    19APR81:22:42     20APR81:05:47         .         0.08                 .        59.00
  165    23APR81:06:03     23APR81:08:04         .         0.04                 .        72.25
  166    26APR81:22:21     27APR81:03:36         .         0.13                 .          .
  167    28APR81:16:18     28APR81:17:29         .         0.09                 .        36.75
  168    30APR81:08:09     30APR81:09:44         .         0.03                 .        38.66
  169    30APR81:18:39     30APR81:23:17         .         0.09                 .         9.00
  170    01MAY81:07:30     01MAY81:12:38       121.0       0.77                 .         8.25
  171    01MAY81:13:45     01MAY81:19:03       121.1       0.51                 .         1.25
  172    06MAY81:14:26     06MAY81:20:54         .         0.06                 .       115.33
  173    10MAY81:12:49     10MAY81:13:48         .         0.02                 .        88.00
  174    10MAY81:19:11     11MAY81:11:33         .         0.48                 .         5.33
  175    11MAY81:22:16     11MAY81:22:31       131.0       0.47                 .        11.25
  176    15MAY81:08:39     15MAY81:18:17         .         0.25                 .        82.25
  177    18MAY81:15:07     19MAY81:15:52         .         0.55                 .        68.75
  178    20MAY81:00:50     20MAY81:02:55         .         0.06                 .         9.00
  179    28MAY81:00:30     28MAY81:06:33         .         0.18                 .       189.75
  180    28MAY81:13:18     28MAY81:21:50         .         0.08                 .         6.75
  181    30MAY81:21:18     30MAY81:21:59         .         0.73                 .        47.50

--------------------------------------------------------- STA=51CR02 ---------------------------------------------------------

  OBS        TIME1              TIME2          STRMNO     PRECIP    DPKRUN    PKRUN     ANTDRY    ALTSTA    DPRECIP

  182    15MAY79:19:40     15MAY79:21:00         .         0.25                 .          .
  183    18MAY79:21:45     19MAY79:04:50         .         0.23                 .        72.75
  184    21MAY79:12:50     21MAY79:13:40         .         0.04                 .        56.00
  185    23MAY79:01:00     23MAY79:05:40         .         0.45                 .        35.00
  186    23MAY79:21:07     24MAY79:05:05         .         0.57                 .        15.50
  187    25MAY79:02:35     25MAY79:03:50       145.0       0.44              0.1103     21.50
  188    25MAY79:13:35     25MAY79:19:10         .         0.72                 .         9.50
  189    28MAY79:17:45     28MAY79:18:15         .         0.08                 .        70.75
  190    31MAY79:20:30     01JUN79:01:50       151.0       2.14        6     1.5300     74.00
  191    02JUN79:23:30     02JUN79:23:50         .         0.38                 .        44.50
  192    03JUN79:09:30     04JUN79:02:55         .         1.79                 .         9.50
  193    10JUN79:20:10     11JUN79:00:10         .         0.26                 .       161.00
  194    11JUN79:05:12     11JUN79:08:55         .         0.18                 .         5.00
  195    02AUG79:15:45     02AUG79:19:00       214.0       1.03              1.8700       .       51OL01
  196    11AUG79:16:15     11AUG79:16:30       221.0         .               0.2070       .       51OL01
  197    21AUG79:01:00     21AUG79:02:28       233.0       0.39              0.0341       .       51CR01
  198    21AUG79:08:40     21AUG79:11:08       233.1       0.40              0.0567      6.25     51CR01
  199    23AUG79:15:22     23AUG79:17:30       235.0       0.50              0.0701     52.00     51CR01
  200    27AUG79:15:25     27AUG79:19:50       239.0       0.63              0.0930       .       51CR01
  201    05SEP79:11:10     06SEP79:01:10       248.0       3.25              4.4300       .       51CR01
  202    21SEP79:05:34     21SEP79:13:41         .         0.71                 .          .       51CR01
```

APPENDIX B-1

PRECIPITATION DATA

```
----------------------------------------------------- STA=51CR02 -----------------------------------------------------
  OBS      TIME1            TIME2          STRMNO   PRECIP   DPKRUN    PKRUN    ANTDRY    ALTSTA    DPRECIP

  203  21SEP79:14:22   22SEP79:01:17     264      2.66 .             9.8500      0.66   51CR01
  204  30SEP79:13:30   01OCT79:07:30     274      2.20              10.4700       .     51OLA1
  205  10NOV79:05:10   10NOV79:13:40      .       0.14                   .         .
  206  11NOV79:13:55   11NOV79:17:05      .       0.10                   .     24.25
  207  26NOV79:02:05   26NOV79:15:30      .       0.54                   .         .
  208  13DEC79:01:25   13DEC79:15:45      .       0.56                   .    394.00   51CR01
  209  11JAN80:11:19   11JAN80:11:49      .       0.03                   .         .
  210  18JAN80:05:51   18JAN80:20:28     18       1.11              0.1602         .   51CR01
  211  24JAN80:00:57   24JAN80:01:49      .       0.11                   .         .
  212  14FEB80:18:02   14FEB80:18:10      .       0.04                   .         .
  213  13MAR80:17:15   13MAR80:18:25      .       0.06                   .         .                SR
  214  14MAR80:13:38   14MAR80:17:06      .       0.39                   .     19.25                SR
  215  17MAR80:08:20   17MAR80:10:05      .       0.03                   .     63.25
  216  21MAR80:00:42   22MAR80:01:54     81       0.93              0.5090     86.75
  217  22MAR80:04:07   22MAR80:10:05      .       0.08                   .      2.25
  218  24MAR80:20:52   24MAR80:21:10      .       0.02                   .     58.75
  219  28MAR80:16:34   29MAR80:02:25      .       0.14                   .     91.33
  220  30MAR80:23:08   31MAR80:04:12      .       0.18                   .     68.66
  221  04APR80:02:21   04APR80:06:49      .       0.09                   .     94.25
  222  07APR80:17:15   07APR80:18:49      .       0.04                   .     82.33
  223  08APR80:22:07   09APR80:04:15    100       0.51              0.3390     27.25
  224  14APR80:11:18   14APR80:15:24    105       0.50              0.0774    127.00
  225  24APR80:16:45   24APR80:17:48      .       0.19                   .    241.25
  226  26APR80:10:30   26APR80:11:25      .       0.14                   .     40.75
  227  27APR80:00:30   27APR80:03:54      .       0.12                   .     13.00
  228  27APR80:15:56   27APR80:18:24      .       0.26                   .     12.00
  229  28APR80:02:44   28APR80:07:59      .       0.19                   .      8.25
  230  28APR80:12:16   28APR80:19:06      .       0.38                   .      4.25
  231  29APR80:23:21   30APR80:02:21      .       0.10                   .     28.50
  232  30APR80:23:29   01MAY80:09:25      .       0.24                   .     21.00
  233  11MAY80:11:37   11MAY80:13:30      .       0.08                   .    242.25
  234  12MAY80:19:10   12MAY80:19:50      .       0.48                   .     29.50
  235  18MAY80:00:05   18MAY80:07:18      .       0.63                   .    124.25
  236  20MAY80:06:45   20MAY80:07:55      .       0.40                   .         .
  237  20MAY80:09:32   20MAY80:09:38      .       0.06                   .      1.50
  238  20MAY80:16:46   21MAY80:07:22      .       0.90                   .      7.00
  239  31MAY80:02:33   31MAY80:02:45      .       0.12                   .    235.00
  240  03JUN80:17:05   03JUN80:18:07      .       0.24                   .     86.25
  241  07JUN80:17:21   07JUN80:17:30      .       0.03                   .     95.33
  242  09JUN80:21:56   10JUN80:00:37      .       0.09                   .     52.50
  243  10JUN80:13:57   10JUN80:14:08      .       0.04                   .     13.33
  244  15JUN80:16:26   15JUN80:17:06    167       0.80              0.3920    122.25
  245  15JUN80:17:12   15JUN80:17:25      .       0.04                   .      0.10
  246  16JUN80:04:21   16JUN80:05:25      .       0.13                   .     11.00
  247  29JUN80:14:07   29JUN80:19:18      .       0.10                   .    325.66
  248  03JUL80:06:30   03JUL80:06:54      .       0.24                   .     83.25
  249  03JUL80:14:15   03JUL80:16:00      .       0.64                   .      7.33
  250  05JUL80:15:33   05JUL80:15:40      .       0.07                   .         .
  251  08JUL80:07:44   08JUL80:11:10      .       0.96                   .     64.00
  252  08JUL80:14:46   08JUL80:16:13      .       0.56                   .      3.50
  253  17JUL80:16:01   17JUL80:16:06      .       0.19                   .    215.75
  254  21JUL80:18:34   21JUL80:19:02      .       0.39                   .     98.50
```

APPENDIX B-1

PRECIPITATION DATA

```
------------------------------------------------------- STA=51CR02 -----------------------------------------------------------------

OBS       TIME1              TIME2          STMNO    PRECIP    DPKRUN    PKRUN     ANTDRY    ALTSTA    DPRECIP

255    22JUL80:14:19    22JUL80:21:18         .       0.44                 .        19.25
256    01AUG80:13:43    01AUG80:13:58       214       0.46              0.0505        .      51CR01
257    03AUG80:18:20    03AUG80:22:37         .       0.15                 .        52.33
258    10AUG80:23:18    11AUG80:00:32         .       0.54                 .          .
259    11AUG80:17:33    11AUG80:17:41         .       0.13                 .        17.00
260    15AUG80:18:48    15AUG80:20:00         .       0.23                 .          .
261    18AUG80:04:39    18AUG80:07:48         .       0.49                 .        56.66
262    10SEP80:03:31    10SEP80:03:56         .       0.05                 .          .
263    17SEP80:22:38    18SEP80:01:12         .       0.73                 .          .
264    25OCT80:00:19    25OCT80:16:20         .       1.78                 .          .      51CR01
265    09NOV80:15:29    09NOV80:15:54         .       0.02                 .          .      51CR01
266    10NOV80:12:35    10NOV80:14:24         .       0.11                 .        20.66
267    02DEC80:19:13    02DEC80:19:41         .       0.11                 .          .
268    09DEC80:12:14    09DEC80:15:16         .       0.13                 .       160.50
269    23DEC80:10:46    23DEC80:11:53         .       0.05                 .          .                 SR
270    15JAN81:13:05    15JAN81:14:08         .       0.05                 .          .
271    21JAN81:00:50    21JAN81:11:25         .       0.14                 .       130.66                SR
272    02FEB81:02:41    02FEB81:10:24         .       1.03                 .       279.25
273    08FEB81:01:58    08FEB81:13:47         .       0.23                 .       135.50
274    10FEB81:21:56    11FEB81:12:59        42       1.01              0.1602      56.25
275    17FEB81:01:29    17FEB81:01:30         .       0.01                 .       132.50
276    19FEB81:13:52    20FEB81:02:18         .       0.59                 .        60.33
277    20FEB81:11:35    20FEB81:12:41         .       0.03                 .         9.25
278    20FEB81:22:29    21FEB81:01:19         .       0.13                 .         9.75
279    22FEB81:08:05    22FEB81:11:30         .       0.07                 .        30.75
280    22FEB81:22:20    23FEB81:16:08         .       0.79                 .        10.75
281    30MAR81:06:38    30MAR81:15:50         .       0.19                 .          .
282    01APR81:15:28    01APR81:16:31         .       0.13                 .        47.66
283    05APR81:08:23    05APR81:18:22         .       0.26                 .        87.75
284    09APR81:08:54    09APR81:17:51         .       0.38                 .        86.50
285    11APR81:09:46    11APR81:10:35         .       0.09                 .        39.75
286    12APR81:03:02    12APR81:06:15         .       0.04                 .        16.50
287    12APR81:17:27    13APR81:03:53         .       0.56                 .        11.25
288    14APR81:04:25    14APR81:07:03         .       0.09                 .        26.50
289    14APR81:16:52    14APR81:17:47         .       0.07                 .         9.75
290    17APR81:06:43    17APR81:11:40         .       0.12                 .        61.00
291    19APR81:22:40    20APR81:05:23         .       0.08                 .        59.00
292    23APR81:05:48    23APR81:08:25         .       0.05                 .        22.50
293    23APR81:20:06    23APR81:21:28         .       0.22                 .        11.66
294    26APR81:22:21    27APR81:03:34         .       0.15                 .        72.75
295    28APR81:16:21    28APR81:17:36         .       0.10                 .        36.75
296    30APR81:08:40    30APR81:09:59         .       0.03                 .        39.00
297    30APR81:18:27    30APR81:23:21         .       0.10                 .         8.50
298    01MAY81:08:35    01MAY81:18:12         .       1.39                 .         9.25
299    06MAY81:14:40    06MAY81:20:12         .       0.07                 .       116.50
300    10MAY81:12:49    10MAY81:22:13         .       0.21                 .        88.66
301    11MAY81:02:15    11MAY81:02:27         .       0.03                 .         4.00
302    11MAY81:08:20    11MAY81:12:13         .       0.19                 .         5.75
303    11MAY81:22:21    11MAY81:22:51       113       0.47              0.0447      10.25
304    12MAY81:09:07    12MAY81:09:19         .       0.02                 .        10.75
305    15MAY81:08:39    15MAY81:18:13         .       0.25                 .        71.33
306    18MAY81:15:05    19MAY81:08:16         .       0.28                 .        68.75
```

APPENDIX B-1

PRECIPITATION DATA

```
------------------------------------------------------------ STA=51CR02 ----------------------------------------------------------------

 OBS       TIME1              TIME2           STRMNO     PRECIP     DPKRUN     PKRUN      ANTDRY     ALTSTA     DPRECIP

 307    19MAY81:12:38     19MAY81:15:55         .         0.30                   .          4.33
 308    20MAY81:00:49     20MAY81:02:55         .         0.06                   .          9.00
 309    28MAY81:00:14     28MAY81:10:40         .         0.16                   .        189.75
 310    28MAY81:18:07     28MAY81:21:30         .         0.09                   .          7.50

------------------------------------------------------------ STA=51CR03 ----------------------------------------------------------------

 OBS       TIME1              TIME2           STRMNO     PRECIP     DPKRUN     PKRUN      ANTDRY     ALTSTA     DPRECIP

 311    05SEP79:11:10     06SEP79:01:10       248         3.25                   .           .       51CR01
 312    04APR80:02:06     04APR80:03:00         .         0.15                   .           .
 313    07APR80:17:50     07APR80:19:25         .         0.04                   .           .
 314    08APR80:22:19     09APR80:06:02       100         0.73                 0.597       26.75
 315    14APR80:10:40     14APR80:14:12         .         0.54                   .         124.66
 316    24APR80:16:44     24APR80:18:34         .         0.21                   .         242.50
 317    26APR80:08:30     26APR80:12:20         .         0.41                   .           .
 318    26APR80:16:23     26APR80:18:39         .         0.32                   .           .
 319    28APR80:04:05     28APR80:10:00         .         0.18                   .           .
 320    28APR80:13:52     28APR80:18:07         .         0.36                   .           .
 321    29APR80:23:58     30APR80:02:56         .         0.25                   .           .
 322    30APR80:23:18     01MAY80:08:46         .         0.31                   .          20.33
 323    12MAY80:19:20     12MAY80:20:01         .         0.44                   .           .
 324    18MAY80:00:01     18MAY80:07:14         .         0.69                   .         124.00
 325    19MAY80:15:45     19MAY80:16:43         .         0.40                   .          32.50
 326    20MAY80:01:54     20MAY80:02:20         .         0.05                   .           9.00
 327    20MAY80:16:33     21MAY80:07:22         .         0.89                   .          14.25
 328    31MAY80:02:32     31MAY80:02:45         .         0.11                   .           .
 329    01JUN80:18:19     01JUN80:19:48         .         0.18                   .          39.50
 330    03JUN80:17:09     03JUN80:18:01         .         0.24                   .          45.33
 331    06JUN80:18:53     06JUN80:19:52         .         0.05                   .          72.75
 332    09JUN80:22:24     10JUN80:01:31         .         0.09                   .           .
 333    10JUN80:07:10     10JUN80:09:36         .         0.04                   .           5.66
 334    10JUN80:13:51     10JUN80:14:00         .         0.04                   .           4.25
 335    15JUN80:16:30     15JUN80:16:42       163         0.89                 0.183      122.50
 336    15JUN80:16:52     15JUN80:17:26         .         0.06                   .           0.17
 337    16JUN80:03:59     16JUN80:06:46         .         0.12                   .          10.50
 338    16JUN80:09:42     16JUN80:12:33         .         0.06                   .           3.00
 339    29JUN80:19:07     29JUN80:19:18         .         0.04                   .           .       51CR02
 340    03JUL80:14:16     03JUL80:17:14         .         0.63                   .           .
 341    25OCT80:02:59     25OCT80:14:14         .         1.71                   .           .
 342    04NOV80:07:08     04NOV80:12:15         .         0.26                   .         233.00
 343    09NOV80:15:40     09NOV80:18:00         .         0.05                   .         123.50
 344    15NOV80:23:46     16NOV80:05:48         .         0.06                   .         149.75
 345    17NOV80:12:32     18NOV80:08:16         .         1.02                   .          30.75
 346    24NOV80:00:51     24NOV80:14:55         .         1.23                   .           .       51CR01
 347    10FEB81:23:29     11FEB81:19:14         .         1.12                   .           .
 348    17FEB81:17:26     17FEB81:17:27         .         0.01                   .         166.25
 349    19FEB81:13:51     20FEB81:02:22         .         0.60                   .          44.33
 350    20FEB81:11:38     20FEB81:12:55         .         0.03                   .           9.25
 351    20FEB81:12:42     21FEB81:01:20         .         0.12                   .           8.75
 352    21FEB81:17:50     21FEB81:17:51         .         0.01                   .          16.50
```

APPENDIX B-1

PRECIPITATION DATA

```
------------------------------------------------------- STA=51CA03 -------------------------------------------------------

 OBS       TIME1              TIME2          STRMNO     PRECIP    DPKRUN    PKRUN     ANTDRY    ALTSTA     DPRECIP

 353   22FEB81:08:16     22FEB81:09:59         .         0.06                  .        14.50    51CA01
 354   23FEB81:18:49     23FEB81:13:30         .         0.77                  .         9.00    51CA01
 355   01MAR81:14:39     01MAR81:14:40         .         0.01                  .       145.25
 356   16MAR81:04:07     16MAR81:04:25         .         0.02                  .          .

------------------------------------------------------- STA=51CA04 -------------------------------------------------------

 OBS       TIME1              TIME2          STRMNO     PRECIP    DPKRUN    PKRUN     ANTDRY    ALTSTA     DPRECIP

 357   25MAY79:02:50     25MAY79:04:40       145         0.44              0.3230        .      51CA01
 358   31MAY79:20:48     01JUN79:01:10       151         2.15              1.0700        .      51CA01
 359   02AUG79:15:45     02AUG79:19:00       214         1.03              0.1015        .      51OLA1
 360   21AUG79:01:00     21AUG79:02:28       213         0.39              0.8820        .      51CA01
 361   23AUG79:15:22     23AUG79:17:30       215         0.50              0.7450        .      51CA01
 362   25AUG79:16:00     25AUG79:20:30       217         0.70              1.2000      46.5     51CA01
 363   27AUG79:15:25     27AUG79:19:50       219         0.63              1.0300        .      51CA01
 364   05SEP79:11:10     06SEP79:01:10       248         3.29              0.4100        .      51CA01
 365   30SEP79:13:30     01OCT79:07:30       274         2.20              3.0800        .      51OLA1
 366   18JAN80:05:51     18JAN80:20:28        18         1.11              0.2070        .      51CA01
 367   04APR80:01:15     04APR80:06:28         .         0.19                .           .
 368   07APR80:16:27     07APR80:19:02         .         0.06                .         82.0
 369   08APR80:21:36     09APR80:05:11         .         0.68                .         26.5
 370   15JUN80:16:30     15JUN80:17:26         .         1.12                .           .      51CA03
 371   16JUN80:03:59     16JUN80:09:42         .         0.17                .           .      51CA03
 372   02FEB81:03:04     02FEB81:12:40         .         1.09                .           .

------------------------------------------------------- STA=51CA05 -------------------------------------------------------

 OBS       TIME1              TIME2          STRMNO     PRECIP    DPKRUN    PKRUN     ANTDRY    ALTSTA     DPRECIP

 373   11MAY79:10:55     11MAY79:13:08         .         0.09                .           .
 374   12MAY79:19:15     12MAY79:19:56         .         0.56                .         30.25
 375   18MAY79:00:18     18MAY79:07:40         .         0.73                .        124.33
 376   31MAY79:20:48     01JUN79:01:10       151         2.15              2.2500        .      51CA01
 377   05SEP79:11:10     06SEP79:01:10       248         3.25                .           .      51CA01
 378   30SEP79:13:30     01OCT79:07:30       274         2.20       G      2.2500        .      51OLA1
 379   02OCT79:20:40     02OCT79:23:30       275         0.40              0.2900        .      51CA01
 380   05OCT79:07:30     05OCT79:13:10       278         1.07              1.6200        .      51CA01
 381   08OCT79:23:30     09OCT79:04:25       282         0.71              0.2340      82.50    51OLA1
 382   06JAN80:10:11     06JAN80:13:17         .         0.27                .           .                  SR
 383   11JAN80:10:45     11JAN80:20:40         .         0.37                .        117.50
 384   14JAN80:11:27     14JAN80:21:30         .         0.51                .         63.00
 385   18JAN80:06:21     18JAN80:20:52        18         1.19              0.4680      81.00
 386   22JAN80:14:01     22JAN80:18:39         .         0.12                .         89.00               SR
 387   28FEB80:13:36     28FEB80:17:34         .         0.06                .           .                  S
 388   13MAR80:17:12     13MAR80:21:36         .         0.48                .        335.50               SR
 389   14MAR80:10:22     14MAR80:17:53         .         0.89                .         12.75               SW
 390   21MAR80:00:19     21MAR80:14:20        81         1.14              0.8540     150.33
 391   24MAR80:06:54     24MAR80:07:56         .         0.03                .         64.66
 392   30MAR80:22:32     31MAR80:06:36        91         0.48              0.0505        .      51CA01
```

APPENDIX B-1

PRECIPITATION DATA

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-------------------------------------------------- STA=SICR05 --------------------------------------------------------

 OBS        TIME1             TIME2         STRMNO     PRECIP    DPKRIN     PKRIN      ANTDRY     ALTSTA    DPRECIP

 393   31MAR80:12:42    31MAR80:16:07        .         0.19                  .           .
 394   04APR80:02:39    04APR80:07:04        .         0.20                  .         82.66
 395   08APR80:22:56    09APR80:07:04      100         0.76               0.1390      112.00
 396   14APR80:10:40    14APR80:14:19      105         0.52               0.0447      123.66
 397   23APR80:00:31    23APR80:00:45        .         0.04                  .        202.00
 398   24APR80:17:09    24APR80:18:56        .         0.21                  .         40.25
 399   19MAY80:15:41    19MAY80:16:39        .         0.39                  .           .
 400   20MAY80:01:46    20MAY80:02:24        .         0.06                  .          9.00
 401   20MAY80:16:28    21MAY80:07:29        .         1.09                  .         14.00
 402   24MAY80:14:56    24MAY80:17:41        .         0.18                  .         79.50
 403   31MAY80:02:34    31MAY80:02:52        .         0.13                  .        151.00
 404   03JUN80:17:04    03JUN80:18:02        .         0.12                  .           .
 405   03JUL80:06:31    03JUL80:07:09        .         0.14                  .           .
 406   03JUL80:14:16    03JUL80:16:13        .         0.56                  .          6.00
 407   05JUL80:15:10    05JUL80:15:38        .         0.10                  .         47.25
 408   08JUL80:07:42    08JUL80:11:18        .         0.83                  .         64.00
 409   08JUL80:14:36    08JUL80:15:51        .         0.63                  .          3.25
 410   17JUL80:16:19    17JUL80:16:26        .         0.18                  .           .
 411   21JUL80:18:44    21JUL80:19:22        .         0.51                  .         98.33
 412   22JUL80:14:11    22JUL80:23:24        .         0.40                  .         18.75
 413   23JUL80:06:17    23JUL80:11:00        .         0.22                  .          6.75
 414   23JUL80:21:56    23JUL80:22:00        .         0.02                  .         11.00
 415   28JUL80:06:24    28JUL80:08:08        .         0.04                  .        104.50
 416   01AUG80:13:47    01AUG80:14:30        .         0.49                  .        101.66
 417   03AUG80:18:30    03AUG80:23:03        .         0.14                  .         52.00
 418   05AUG80:16:36    05AUG80:17:22        .         0.05                  .         41.50
 419   11AUG80:00:59    11AUG80:02:20        .         0.58                  .        127.66
 420   11AUG80:17:41    11AUG80:17:50        .         0.09                  .         15.33
 421   15AUG80:19:09    15AUG80:21:09        .         0.19                  .         97.33
 422   18AUG80:04:55    18AUG80:07:58        .         0.52                  .         55.75
 423   19AUG80:10:33    19AUG80:12:20        .         0.04                  .         26.50
 424   17SEP80:18:13    17SEP80:18:18        .         0.02                  .           .
 425   17SEP80:23:36    18SEP80:02:23        .         0.67                  .          5.33
 426   22SEP80:17:56    22SEP80:17:57        .         0.01                  .        111.50
 427   25SEP80:00:45    25SEP80:08:09        .         1.11                  .         54.75
 428   02OCT80:17:13    03OCT80:09:23        .         0.23                  .        177.00
 429   25OCT80:00:17    25OCT80:16:42        .         1.84                  .           .
 430   04NOV80:07:19    04NOV80:11:38        .         0.27                  .        230.33
 431   09NOV80:15:38    09NOV80:16:05        .         0.07                  .        124.00
 432   15NOV80:23:13    16NOV80:03:25        .         0.02                  .        151.00
 433   17NOV80:12:33    18NOV80:08:29        .         1.13                  .         33.00
 434   24NOV80:04:25    24NOV80:15:03        .         0.99                  .           .
 435   27NOV80:10:06    28NOV80:01:21        .         0.31                  .         67.00
 436   02DEC80:19:01    02DEC80:19:33        .         0.12                  .        113.66
 437   09DEC80:11:57    09DEC80:15:11        .         0.14                  .        160.50
 438   16DEC80:09:28    16DEC80:09:49        .         0.02                  .        162.33
 439   23DEC80:10:46    23DEC80:11:53        .         0.08                  .           .                  SR
 440   15JAN81:13:11    15JAN81:13:45        .         0.04                  .           .
 441   21JAN81:00:48    21JAN81:12:15        .         0.16                  .        131.00                  SR
 442   10FEB81:15:46    10FEB81:15:47        .         0.01                  .           .
 443   10FEB81:23:58    11FEB81:08:56       42         0.98                  .          8.25
 444   20FEB81:11:39    20FEB81:12:37        .         0.03                  .           .
```

APPENDIX B-1
PRECIPITATION DATA

```
------------------------------------------------------ STA=51CA05 --------------------------------------------------------

 OBS        TIME1              TIME2         STRMNO     PRECIP    DPKRUN    PKRUN     ANTDRY     ALTSTA    DPRECIP

 445    20FEB80:20:58      21FEB80:00:30       .         0.13                 .         8.33
 446    21FEB80:17:04      21FEB80:17:05       .         0.01                 .        16.50
 447    22FEB80:08:16      22FEB80:09:59       .         0.07                 .        15.25     51CA01
 448    22FEB80:18:49      23FEB80:16:02       .         0.73                 .         9.00     51CA01
 449    04MAR80:19:10      05MAR80:11:25       .         0.42                 .          .
 450    05MAR80:22:12      05MAR80:22:13       .         0.01                 .        10.45
 451    16MAR80:04:22      16MAR80:14:13       .         0.17                 .       246.25
 452    05APR80:08:35      05APR80:18:20       .         0.28                 .          .
 453    26APR80:22:17      27APR80:04:01       .         0.13                 .          .
 454    28APR80:16:52      28APR80:17:34       .         0.09                 .        36.75
 455    30APR80:09:09      30APR80:11:01       .         0.03                 .        39.50
 456    30APR80:18:40      30APR80:23:13       .         0.10                 .         7.66
 457    01MAY80:07:37      01MAY80:18:54       .         1.09                 .         8.50
 458    10MAY80:12:47      10MAY80:13:58       .         0.03                 .          .
 459    10MAY80:20:33      10MAY80:22:11       .         0.07                 .         6.50
 460    11MAY80:10:25      11MAY80:13:20       .         0.28                 .          .
 461    11MAY80:22:35      11MAY80:23:01       .         0.41                 .         9.25
 462    18MAY80:15:08      19MAY80:16:02       .         0.62                 .          .
 463    20MAY80:01:01      20MAY80:02:54       .         0.07                 .         9.00
 464    27MAY80:00:14      27MAY80:07:45       .         0.23                 .       165.75
 465    28MAY80:12:11      28MAY80:19:32       .         0.13                 .        28.75
 466    30MAY80:21:15      30MAY80:22:13       .         0.78                 .        49.75

------------------------------------------------------ STA=51CA07 --------------------------------------------------------

 OBS            TIME1              TIME2     STRMNO     PRECIP    DPKRUN    PKRUN     ANTDRY     ALTSTA    DPRECIP

 467                .      14APR80:13:48      105.0      0.21               6.040        .       51CA08
 468                .                  .      222.0      0.08                 .          .       51OL01
 469                .                  .      232.0      0.17               3.120        .       51OL01
 470                .                  .      236.0        .                  .          .
 471                .                  .      236.1        .                6.290        .
 472                .                  .      237.0        .                  .          .
 473                .                  .      238.0        .                  .          .
 474                .                  .      299.0      2.25        G     30.400        .       51OL01
 475                .                  .      302.0      0.04               0.483        .       51CA08
 476                .                  .      309.0      0.28               1.690        .       51CA08
 477                .                  .      329.0      0.78               3.800        .       51CA08
 478                .                  .      332.0      0.37               1.014        .       51CA08
 479                .                  .      344.0      0.17                 .          .       51CA08
 480    11JUN79:00:45      11JUN79:06:15      162.0      0.12               1.390        .       51OL01
 481    11JUN79:07:25      11JUN79:10:20      162.1      0.10               0.492       1.00     51OL01
 482    17JUN79:03:20      17JUN79:06:45      168.0      0.12                 .       117.00     51OL01
 483    17JUN79:09:50      17JUN79:10:30      168.1      0.13                 .         3.00     51OL01
 484    23JUN79:22:50      24JUN79:00:30      174.0      0.14               2.460     156.25     51OL01
 485    28JUN79:22:00      28JUN79:22:25      179.0      0.05               1.170        .       51OL01
 486    04JUL79:11:58      04JUL79:14:40      185.0      0.43               2.460        .       51OL01
 487    19AUG79:19:25      19AUG79:19:55      231.0      0.09                 .          .       51OL01
 488    21AUG79:01:10                  .      233.0      0.21               0.796      29.25     51OL01
 489    05SEP79:09:00      06SEP79:02:30      248.0      3.26              23.300        .       51CA08
 490    21SEP79:06:00      21SEP79:17:10      264.0      0.70              30.900        .       51OL01
```

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                                              APPENDIX B-1
                                           PRECIPITATION DATA
------------------------------------------------------ STA=51CA07 ------------------------------------------------------
     OBS        TIME1             TIME2          STRMNO    PRECIP    DPKRUN    PKRUN     ANTDRY    ALTSTA    DPRECIP

     491    21SEP79:17:10    22SEP79:01:20       264.1      2.89              42.500       0.00    51OL01
     492    30SEP79:22:40    01OCT79:02:50       274.0      0.40              23.300        .      51OL01
     493    01OCT79:02:50    01OCT79:07:15       274.1      1.68              36.500       0.00    51OL01
     494    01OCT79:12:50    02OCT79:03:10       274.2      0.80               6.800       5.50    51OL01
     495    02OCT79:22:45    03OCT79:04:30       275.0      0.32               9.630      19.50    51CA08
     496    05OCT79:08:45    05OCT79:13:00       278.0      0.90               7.460      52.25    51OL01
     497    18JAN80:05:05    18JAN80:12:15        18.0      0.40               6.040        .      51OL01
     498    18JAN80:12:15    18JAN80:20:25        18.1      0.88               9.030       0.00    51OL01
     499    22FEB80:02:12    22FEB80:05:10        53.0      0.21               1.760        .      51CA08
     500    24MAR80:19:22    24MAR80:22:49          .       0.24               1.170        .      51CA08
     501    28MAR80:15:03    29MAR80:06:48        88.0      0.99               1.630      88.25    51CA08
     502    30MAR80:14:20    31MAR80:14:55        91.0      0.18               5.570      31.50    51CA08
     503    04APR80:03:30    04APR80:07:09        95.0      0.27               2.460        .      51CA08
     504    08APR80:21:45    09APR80:06:01       100.0      0.55               4.670     110.75    51CA08
     505    24APR80:17:42    24APR80:20:09       115.0      0.34               5.110     244.00    51CA08
     506    27APR80:17:54    27APR80:21:00       118.0      0.35              25.300        .      51CA08
     507    27APR80:22:10    28APR80:04:37       118.1      0.14               0.492       1.25    51CA08
     508    28APR80:11:31    28APR80:12:12       119.0      0.08               1.170       6.75    51CA08
     509    28APR80:14:12    28APR80:17:14       119.1      0.27               1.510       2.00    51CA08
     510    18MAY80:01:07    18MAY80:07:47       139.0      1.01               2.780        .      51CA08
     511    19MAY80:16:25    19MAY80:17:30       140.0      0.27               2.170      32.75    51CA08
     512    24JUN80:00:14    24JUN80:00:28       176.0      0.10               0.974        .      51CA08
     513    29JUN80:19:32    29JUN80:19:54       181.0      0.12               2.780     139.00    51CA08
     514    03JUL80:06:51    03JUL80:08:17       185.0      0.32              23.300        .      51CA08
     515    03JUL80:14:26    03JUL80:15:01       185.1      0.45        G     23.300       6.25    51CA08
     516    05JUL80:15:20    05JUL80:15:34       187.0      0.29              14.000      48.33    51OL01
     517    08JUL80:08:18    08JUL80:11:34       190.0      0.42               5.110      64.75    51CA08
     518    08JUL80:14:52    08JUL80:16:31       190.1      0.33              23.300       3.33    51CA08
     519    21JUL80:18:55    21JUL80:19:20       203.0      0.99              24.300        .      51OL01
     520    21JUL80:19:22    21JUL80:19:50       203.1      0.11               5.570       0.03    51OL01
     521    22JUL80:17:19    22JUL80:20:04       204.0      0.37              24.300      21.50    51OL01
     522    22JUL80:20:46    22JUL80:22:37       204.1      0.07               4.250       0.75    51OL01
     523    29JUL80:01:15    29JUL80:01:41       211.0      0.03               0.794        .      51OL01
     524    01AUG80:13:58    01AUG80:14:23       214.0      0.70               1.390        .      51OL01
     525    03AUG80:16:02    03AUG80:20:51       216.0      0.88               3.120      49.66    51OL01
     526    03AUG80:22:36    04AUG80:00:22       216.1      0.09               5.570       1.75    51OL01
     527    18AUG80:05:32    18AUG80:08:19       231.0      0.42               6.040        .      51CA08
     528    10SEP80:03:15    10SEP80:04:53       254.0      0.06              21.950        .      51OL01
     529    25SEP80:01:56    25SEP80:10:15       269.0      0.37               0.596        .      51CA08
     530    02OCT80:19:01    03OCT80:02:08       276.0      0.51               0.296     176.75    51CA08
     531    21FEB81:23:32    22FEB81:00:44        52.0      0.09               0.832        .      51CA08
     532    22FEB81:12:06    24FEB81:04:19        53.0      0.85              11.300        .      51CA08
     533    04MAR81:18:43    05MAR81:11:08        63.0      0.37               1.080        .      51CA08
     534    30MAR81:06:52    30MAR81:16:26        89.0      0.92               7.360        .      51CA08
     535    01APR81:15:34    01APR81:16:29        91.0      0.21               3.270        .      51CA08
     536    09APR81:09:50    09APR81:13:21        99.0      0.25               1.690        .      51CA08
     537    12APR81:17:39    13APR81:05:21       102.0      0.56               3.400        .      51CA08
     538    14APR81:17:09    17APR81:18:45       104.0      0.10               2.300        .      51CA08
     539    17APR81:08:17    17APR81:12:29       107.0      0.17               1.147        .      51CA08
     540    30APR81:08:15    30APR81:10:49       120.0      0.12               0.748        .      51CA08
     541    30APR81:21:53    30APR81:23:34       120.1      0.10               1.014      11.00    51CA08
     542    01MAY81:09:20    01MAY81:17:50       121.0      0.72               5.330       9.75    51CA08
```

```
                                   APPENDIX B-1
                                PRECIPITATION DATA
------------------------------------------------- STA=51CR07 -------------------------------------------------
 OBS       TIME1            TIME2         STPMNO    PRECIP    DPKRUN    PKRUN     ANTDRY    ALTSTA    DPRECIP

 543   10MAY81:12:19    10MAY81:14:41      30.0      0.12              2.250        .      51CR08
 544   10MAY81:19:34    10MAY81:21:30      30.1      0.17              5.760      4.75     51CR08
 545   11MAY81:01:39    11MAY81:03:04      31.0      0.07              0.920      4.25     51CR08
 546   11MAY81:10:39    11MAY81:14:06      31.1      0.44              5.090      7.50     51CR08
 547   11MAY81:19:48    11MAY81:22:35      31.2      0.21              4.920      5.66     51CR08
 548   12MAY81:06:28    12MAY81:08:54      32.0      0.22              3.270      7.75     51CR08
 549   15MAY81:11:44    15MAY81:13:12      35.0      0.18              1.730     74.75     51CR08
 550   18MAY81:16:57    19MAY81:03:24      39.0      0.16              1.147        .      51CR08
 551   19MAY81:12:46    20MAY81:01:43      39.1      0.31              1.182      9.33     51CR08
 552   29MAY81:20:43    29MAY81:21:03        .       0.08              1.820        .      51CR08

------------------------------------------------- STA=51CR08 -------------------------------------------------
 OBS       TIME1            TIME2         STPMNO    PRECIP    DPKRUN    PKRUN     ANTDRY    ALTSTA    DPRECIP

 553         .          14APR80:13:48      105       0.21              2.6800        .
 554         .                .            222       0.08              0.8500        .      51OL01
 555         .                .            232       0.17              0.9960        .      51OL01
 556         .                .            236        .                0.7450        .
 557         .                .            237        .                0.1015        .
 558         .                .            299       2.25        6    19.2000        .      51OL01
 559         .                .            309       0.28              1.2700        .
 560         .                .            312       0.37              1.1300        .
 561         .                .            317       0.05              0.3630        .
 562         .                .            344       0.17              1.2300        .
 563   17JUN79:03:20    17JUN79:06:45      168       0.32              0.3390        .      51OL01
 564   13JUL79:18:05    13JUL79:18:13       .        0.04                .           .
 565   14JUL79:06:38    14JUL79:06:50       .        0.02                .         12.25
 566   24JUL79:09:48    24JUL79:15:45       .        0.11                .           .
 567   25JUL79:08:35    25JUL79:09:40       .        0.03                .         17.00
 568   28JUL79:00:57    28JUL79:01:20       .        0.22                .         63.50
 569   29JUL79:14:25    29JUL79:15:17       .        0.68                .         37.00
 570   06AUG79:03:15    06AUG79:03:30       .        0.05                .        180.00
 571   21AUG79:01:10          .            233       0.21              0.2340        .      51OL01
 572   03SEP79:02:27    03SEP79:03:16       .        0.06                .           .
 573   03SEP79:20:55    03SEP79:23:38       .        0.24                .         17.66
 574   05SEP79:04:00    06SEP79:02:30       .        3.26                .         33.33
 575   14SEP79:15:50    14SEP79:15:58       .        0.06                .           .
 576   28SEP79:11:50    28SEP79:15:20       .        0.16                .           .
 577   29SEP79:06:58    29SEP79:07:21       .        0.03                .         15.50
 578   29SEP79:21:52    29SEP79:23:17       .        0.19                .         14.66
 579   30SEP79:10:25    30SEP79:13:58       .        0.10                .         11.00
 580   30SEP79:17:05    01OCT79:07:15       .        1.73                .          3.00
 581   01OCT79:13:20    01OCT79:14:25       .        0.23                .          6.00
 582   01OCT79:23:57    02OCT79:04:27       .        0.27                .          9.50
 583   02OCT79:22:45    03OCT79:04:30       .        0.32                .         18.25
 584   11OCT79:01:45    11OCT79:09:55       .        0.53                .        189.25
 585   23OCT79:16:20    23OCT79:21:45       .        0.32                .           .
 586   28OCT79:10:45    28OCT79:12:00       .        0.02                .        109.50
 587   02NOV79:14:50    03NOV79:01:55       .        0.53                .        122.75
 588   10NOV79:03:01    10NOV79:18:00       .        0.35                .        169.00
```

APPENDIX B-1

PRECIPITATION DATA

STA=SIC808

OBS	TIME1	TIME2	STPHNO	PRECIP	DPKRUN	PKRUN	ANTDRY	ALTSTA	DPRECIP
589	11NOV79:09:12	11NOV79:21:37	.	0.56		.	15.25		
590	13NOV79:03:28	.	.	0.09		.	29.83		
591	26NOV79:15:13	26NOV79:15:42	.	0.06		.	.		
592	13DEC79:05:45	13DEC79:15:37	.	0.48		.	.		
593	24DEC79:03:00	24DEC79:04:30	.	0.03		.	251.33		
594	24DEC79:12:00	25DEC79:01:45	.	0.35		.	7.50		
595	11JAN80:10:45	11JAN80:16:00	.	0.36		.	.		
596	11JAN80:20:45	11JAN80:22:50	.	0.07		.	4.75		
597	14JAN80:11:24	14JAN80:19:47	.	0.17		.	60.50		
598	22JAN80:13:45	22JAN80:21:38	.	0.34		.	.		SR
599	31JAN80:13:45	31JAN80:18:07	.	0.06		.	208.00		
600	07FEB80:10:59	07FEB80:12:00	.	0.08		.	161.00		S
601	10FEB80:09:47	10FEB80:12:45	.	0.15		.	69.75		S
602	16FEB80:03:46	16FEB80:10:27	.	0.20		.	135.00		
603	21FEB80:01:20	21FEB80:03:41	.	0.08		.	111.00		
604	22FEB80:02:12	22FEB80:05:10	.	0.21		.	23.50		
605	13MAR80:14:06	14MAR80:02:12	.	1.13		.	.		SR
606	14MAR80:09:15	14MAR80:11:49	.	0.21		.	7.00		SR
607	17MAR80:23:14	18MAR80:00:19	.	0.08		.	83.50		
608	20MAR80:23:30	21MAR80:07:39	.	0.72		.	71.00		
609	21MAR80:09:35	21MAR80:12:57	.	0.28		.	2.00		
610	24MAR80:19:22	24MAR80:22:49	.	0.24		.	78.50		
611	28MAR80:15:03	29MAR80:06:48	.	0.99		.	88.00		
612	30MAR80:18:42	31MAR80:08:45	.	0.40		.	36.00		
613	31MAR80:14:20	31MAR80:14:55	.	0.18		.	5.50		
614	04APR80:03:30	04APR80:07:09	.	0.27		.	86.50		
615	08APR80:21:45	09APR80:06:01	.	0.55		.	110.75		
616	14APR80:20:57	14APR80:21:23	.	0.22		4.670	7.25		
617	24APR80:17:42	24APR80:20:09	115.0	0.34		6.180	236.25		
618	26APR80:09:39	26APR80:16:51	.	0.22		.	37.66		
619	26APR80:19:33	27APR80:02:05	118.0	0.17		0.965	2.66		
620	27APR80:17:54	27APR80:21:00	118.1	0.35		7.140	16.00		
621	27APR80:22:10	28APR80:04:37	118.2	0.14		0.818	1.25		
622	28APR80:11:31	28APR80:17:14	119.0	0.36		2.970	6.75		
623	29APR80:22:49	30APR80:01:42	120.0	0.16		1.130	29.50		
624	01MAY80:00:22	01MAY80:09:27	.	0.16		.	22.50		
625	02MAY80:22:27	02MAY80:23:20	.	0.17		.	37.00		
626	07MAY80:19:38	07MAY80:21:50	.	0.05		.	116.33		
627	08MAY80:05:21	08MAY80:10:50	.	0.12		.	7.50		
628	11MAY80:12:18	11MAY80:12:46	.	0.04		.	73.50		
629	18MAY80:01:07	18MAY80:07:47	.	1.01		.	156.25		
630	19MAY80:16:25	19MAY80:17:30	140.0	0.27		3.930	32.75		
631	20MAY80:17:12	21MAY80:07:34	.	0.72		.	23.75		
632	24MAY80:17:06	24MAY80:21:02	.	0.08		.	81.50		
633	01JUN80:20:20	01JUN80:21:39	.	0.04		.	143.33		
634	03JUN80:18:21	03JUN80:23:18	.	0.13		.	.		
635	06JUN80:16:36	06JUN80:17:43	.	0.02		.	.		
636	07JUN80:17:38	07JUN80:20:12	.	0.11		.	23.75		
637	09JUN80:22:46	10JUN80:10:32	.	0.12		.	50.50		
638	15JUN80:16:54	15JUN80:17:52	167.0	0.55		8.980	126.50		
639	16JUN80:06:03	16JUN80:06:20	168.0	0.11		2.160	12.25		
640	16JUN80:08:45	16JUN80:09:56	168.1	0.08		1.130	2.50		

APPENDIX B-1

PRECIPITATION DATA

```
------------------------------------------------------------ STA=SICR08 ------------------------------------------------------------

OBS      TIME1              TIME2           STRMNO    PRECIP    DPKRUN     PKRUN      ANTDRY    ALTSTA    DPRECIP

641   24JUN80:00:14     24JUN80:00:28      176.0      0.10               1.4900     182.25
642   29JUN80:19:32     29JUN80:19:54      181.0      0.12               3.5900     139.00
643   03JUL80:06:51     03JUL80:08:17        .        0.32                 .         83.00
644   03JUL80:14:26     03JUL80:15:01      185.1      0.45              12.6000       6.25
645   08JUL80:08:18     08JUL80:11:34      190.0      0.42               5.9100        .
646   08JUL80:14:52     08JUL80:16:31      190.1      0.33              13.3000       3.33
647   09JUL80:21:07     09JUL80:21:22        .        0.02                 .           .
648   01AUG80:13:58     01AUG80:14:23      214.0      0.70               0.4780        .       SIOL01
649   05AUG80:17:53     05AUG80:18:42        .        1.93                 .           .
650   10AUG80:07:12     10AUG80:07:26        .        0.04                 .        108.50
651   15AUG80:22:26     16AUG80:02:44      229.0      0.10               0.1834     135.00
652   18AUG80:05:32     18AUG80:08:19      231.1      0.42               0.7100      50.80
653   17SEP80:23:50     18SEP80:02:45        .        0.03                 .           .
654   25SEP80:01:56     25SEP80:10:15      269.0      0.37               0.2800     167.25
655   02OCT80:19:01     03OCT80:02:08        .        0.51                 .        176.75
656   03OCT80:12:42     03OCT80:15:27        .        0.23                 .         10.50
657   11OCT80:15:08     11OCT80:15:19      285.0      0.05               0.3280     191.66
658   18OCT80:10:56     18OCT80:11:16        .        0.02                 .        163.66
659   18OCT80:16:48     19OCT80:02:13        .        1.87                 .          5.50
660   22OCT80:10:11     22OCT80:10:16        .        0.04                 .         80.00
661   09NOV80:03:44     09NOV80:04:29        .        0.25                 .           .
662   15NOV80:21:41     16NOV80:06:01        .        0.09                 .        161.25
663   17NOV80:12:24     18NOV80:01:20      322.0      1.03               2.6200      30.33
664   06DEC80:04:18     06DEC80:09:19        .        0.01                 .           .
665   23DEC80:04:46     23DEC80:12:05        .        0.09                 .        168.50              SR
666   07JAN81:10:00     07JAN81:11:37        .        0.11                 .           .                S
667   15JAN81:13:11     15JAN81:14:00        .        0.07                 .        193.50
668   21JAN81:01:32     21JAN81:07:58        .        0.10                 .         31.50              SR
669   02FEB81:04:11     02FEB81:11:25        .        0.69                 .        284.25
670   08FEB81:01:49     08FEB81:14:13       39.0      0.20               1.3400     134.50
671   10FEB81:23:04     11FEB81:18:44        .        0.93                 .         57.00
672   14FEB81:19:00     20FEB81:02:50       50.0      0.33                 .        192.75
673   20FEB81:09:20     20FEB81:12:41       51.0      0.04               0.4990       6.50
674   21FEB81:23:32     22FEB81:00:44       52.0      0.09               1.3400      35.00
675   22FEB81:12:06     24FEB81:04:19       53.1      0.85               7.4500      11.50
676   04MAR81:18:43     05MAR81:11:08        .        0.37                 .        206.66
677   16MAR81:11:24     16MAR81:14:59        .        0.13                 .        264.25
678   30MAR81:06:52     30MAR81:16:26       89.0      0.52               3.8600     328.00
679   01APR81:15:34     01APR81:16:29       91.0      0.21               3.5900        .
680   05APR81:12:44     05APR81:19:21       95.0      0.38               5.0600      92.25
681   09APR81:04:50     09APR81:13:21       99.0      0.25               2.1100      86.50
682   12APR81:17:34     13APR81:05:21      102.0      0.56               2.7400      76.33
683   14APR81:17:08     14APR81:18:45      104.0      0.10               0.9040      35.75
684   17APR81:08:17     17APR81:12:29      107.0      0.17               1.0590      61.50
685   20APR81:03:49     20APR81:05:48        .        0.10                 .         63.33
686   23APR81:21:01     23APR81:22:07      113.0      0.48               8.9800      89.75
687   27APR81:02:34     27APR81:03:51      117.0      0.08               0.5200      76.50
688   30APR81:08:15     30APR81:10:49        .        0.12               0.6110      76.33
689   30APR81:21:53     30APR81:22:28      120.1      0.10               0.7100      11.00
690   01MAY81:09:20     01MAY81:17:50      121.0      0.72       G      11.5000      11.00
691   06MAY81:20:00     06MAY81:21:35        .        0.03                 .        122.75
692   10MAY81:12:19     10MAY81:14:41        .        0.12                 .         86.75
```

APPENDIX B-1

PRECIPITATION DATA

```
------------------------------------------------------------- STA=SICA08 -------------------------------------------------------------

 OBS        TIME1              TIME2         STRMNO     PRECIP    DPKRUN     PKRUN     ANTDRY     ALTSTA     DPRECIP

 693    10MAY81:19:34    10MAY81:21:30        .         0.17                   .         5.00
 694    11MAY81:01:39    11MAY81:03:04        .         0.07                   .         4.25
 695    11MAY81:10:39    11MAY81:14:06     131.1        0.44                 5.31        7.50
 696    11MAY81:19:48    11MAY81:22:35        .         0.21                   .         5.66
 697    12MAY81:06:28    12MAY81:08:54        .         0.22                   .         7.75
 698    15MAY81:11:44    15MAY81:13:12     135.0        0.18                 1.49       74.75
 699    18MAY81:16:57    19MAY81:03:24        .         0.16                   .        75.75
 700    19MAY81:17:46    20MAY81:01:43        .         0.31                   .         9.33
 701    28MAY81:00:07    28MAY81:06:22        .         0.14                   .       190.75
 702    28MAY81:10:52    28MAY81:12:04        .         0.26                   .         4.50
 703    29MAY81:20:43    29MAY81:21:03        .         0.08                 0.71       32.66
 704    30MAY81:22:08    30MAY81:22:37        .         0.03                   .        25.00

------------------------------------------------------------- STA=SICA09 -------------------------------------------------------------

 OBS        TIME1              TIME2         STRMNO     PRECIP    DPKRUN.    PKRUN     ANTDRY     ALTSTA     DPRECIP

 705    30JUN79:15:50    30JUN79:16:20       181        0.31                 0.207        .        SICA10
 706    05SEP79:11:10    06SEP79:01:10       248        3.35                 0.980        .        SICA01
 707    21SEP79:14:22    22SEP79:01:17       264        2.66                 0.400        .        SICA01
 708    30SEP79:13:30    01OCT79:07:30       274        2.20                   .          .        SIOL01
 709    23OCT79:14:40    23OCT79:17:14        .         0.34                   .          .
 710    01NOV79:11:38    02NOV79:00:30        .         0.59                   .       210.50
 711    03NOV79:03:03    03NOV79:07:55        .         0.05                   .        27.00
 712    09NOV79:00:52    09NOV79:01:12        .         0.02                   .       137.00
 713    10NOV79:01:37    10NOV79:11:24        .         0.04                   .        28.33
 714    11NOV79:09:45    11NOV79:18:03        .         0.40                   .        22.25
 715    13NOV79:02:09    13NOV79:11:47        .         0.12                   .         8.25
 716    13NOV79:16:10    13NOV79:21:10        .         0.04                   .         4.33
 717    13DEC79:02:20    13DEC79:15:23        .         0.28                   .       701.33
 718    18JAN80:03:43    18JAN80:19:51       18         1.05                 0.509        .
 719    22JAN80:14:02    22JAN80:18:00        .         0.08                   .        90.00                  58
 720    25JAN80:11:12    25JAN80:12:23        .         0.04                   .        65.50
 721    10FEB80:10:38    10FEB80:11:07        .         0.05                   .       382.33                  5
 722    20FEB80:20:59    20FEB80:21:58        .         0.08                   .       250.00
 723    22FEB80:00:47    22FEB80:03:08        .         0.27                   .        26.75
 724    25FEB80:02:37    25FEB80:04:30        .         0.12                   .        71.50
 725    20MAR80:21:46    21MAR80:12:22       81         1.15        G        1.570        .        SICA10
 726    28MAR80:16:12    29MAR80:04:23       88         0.78                 0.262        .
 727    30MAR80:21:38    31MAR80:06:26       91         0.51                 0.339       41.00
 728    31MAR80:12:35    31MAR80:14:12        .         0.13                   .         6.00
 729    04APR80:02:06    04APR80:06:33        .         0.22                   .          .
 730    07APR80:14:57    07APR80:18:52        .         0.09                   .        80.50
 731    08APR80:22:40    09APR80:05:00      100         0.63                 0.509       27.66
 732    12APR80:21:04    12APR80:22:19        .         0.04                   .        88.00
 733    14APR80:10:25    14APR80:14:15      105         0.57                 0.291       36.00
 734    24APR80:16:34    24APR80:18:21        .         0.14                   .       242.25
 735    26APR80:13:49    26APR80:17:31        .         0.05                   .        43.50
 736    26APR80:23:59    27APR80:10:42        .         0.34                   .         6.50
 737    27APR80:15:03    27APR80:18:06        .         0.22                   .         4.50
 738    28APR80:05:08    28APR80:06:59        .         0.04                   .        11.25
```

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                                                    APPENDIX B-1
                                                 PRECIPITATION DATA
------------------------------------------------------- STA=SIC809 ---------------------------------------------------------------
        OBS       TIME1              TIME2           STPMNO     PRECIP     DPKRUN     PKRUN     ANTDRY     ALTSTA     DPRECIP

        739   28APR80:17:33      28APR80:19:17          .         0.16                   .        10.50
        740   29APR80:19:58      30APR80:04:51          .         0.57                   .        24.66
        741   30APR80:23:48      01MAY80:09:38          .         0.26                   .        19.00
        742   17MAY80:23:22      18MAY80:07:25          .         0.76                   .          .
        743   19MAY80:15:59      19MAY80:16:28        140         0.51                 0.129      32.50
        744   20MAY80:14:44      21MAY80:06:59        141         1.28                 0.882      22.25     SIC818
        745   01JUN80:17:50      01JUN80:20:22          .         0.30                   .          .
        746   03JUN80:16:10      03JUN80:23:39        155         0.26                 0.597      43.75
        747   04JUN80:00:52      04JUN80:01:33          .         0.05                   .         1.25
        748   06JUN80:07:20      06JUN80:08:30          .         0.03                   .        77.75
        749   09JUN80:22:07      09JUN80:22:50          .         0.02                   .          .
        750   10JUN80:06:03      10JUN80:07:35          .         0.04                   .         7.25
        751   15JUN80:19:47      15JUN80:20:22          .         0.50                   .       132.00
        752   16JUN80:05:26      16JUN80:09:48          .         0.17                   .         9.00
        753   23JUN80:20:36      23JUN80:21:50          .         0.43                   .          .
        754   29JUN80:19:17      29JUN80:19:32          .         0.08                   .          .
        755   03JUL80:13:41      03JUL80:14:38          .         0.23                   .          .
        756   08JUL80:08:13      08JUL80:11:18          .         0.58                   .       113.50
        757   08JUL80:15:00      08JUL80:16:18        190         0.47                 0.291       3.66
        758   17JUL80:15:05      17JUL80:15:27          .         0.16                   .          .
        759   21JUL80:17:55      21JUL80:18:04          .         0.09                   .          .
        760   22JUL80:14:23      22JUL80:20:30        204         0.98                 0.291      20.33
        761   22JUL80:21:52      22JUL80:21:00          .         0.02                   .         1.33
        762   23JUL80:06:46      23JUL80:11:03          .         0.48                   .         7.75
        763   23JUL80:20:11      23JUL80:20:40          .         0.05                   .         9.25
        764   28JUL80:05:19      28JUL80:05:24          .         0.02                   .       104.66
        765   28JUL80:12:18      28JUL80:12:54          .         0.12                   .         7.00
        766   28JUL80:21:50      29JUL80:05:15          .         0.38                   .         9.00
        767   03AUG80:15:10      03AUG80:23:32          .         0.35                   .          .
        768   05AUG80:16:00      05AUG80:17:23          .         0.27                   .        40.50
        769   09AUG80:16:33      09AUG80:17:14          .         0.27                   .        95.25
        770   10AUG80:23:04      10AUG80:23:27          .         0.16                   .        29.75
        771   15AUG80:19:55      15AUG80:20:34          .         0.07                   .       116.50
        772   18AUG80:05:09      18AUG80:13:39          .         0.42                   .        56.50
        773   19AUG80:10:11      19AUG80:12:45          .         0.02                   .        20.50
        774   09SEP80:21:03      09SEP80:23:57          .         0.08                   .       512.33
        775   10SEP80:03:05      10SEP80:03:06          .         0.01                   .         3.00
        776   14SEP80:17:31      14SEP80:17:41          .         0.02                   .       110.50
        777   17SEP80:17:12      17SEP80:17:33          .         0.03                   .        71.50
        778   17SEP80:22:32      18SEP80:01:33          .         0.89                   .         5.00
        779   21SEP80:17:53      21SEP80:18:06          .         0.11                   .        88.33
        780   25SEP80:00:32      25SEP80:08:16          .         0.93                   .        78.50
        781   30SEP80:07:59      30SEP80:08:49          .         0.03                   .       119.75
        782   02OCT80:21:41      03OCT80:09:55          .         0.07                   .        61.00
        783   03OCT80:22:20      03OCT80:22:55          .         0.02                   .        12.50
        784   18OCT80:16:22      18OCT80:18:54          .         0.35                   .       351.50
        785   25OCT80:13:25      25OCT80:15:45          .         0.07                   .          .
        786   04NOV80:07:25      04NOV80:11:40          .         0.27                   .       231.66
        787   14NOV80:22:27      14NOV80:22:44          .         0.02                   .          .
        788   15NOV80:22:14      16NOV80:06:20          .         0.06                   .        23.50
        789   17NOV80:11:58      17NOV80:20:43          .         0.63                   .        29.66
        790   24NOV80:00:06      24NOV80:14:35        329         1.17                 0.129        .
```

APPENDIX B-1

PRECIPITATION DATA

```
------------------------------------------------ STA=51C809 --------------------------------------------------------
 OBS        TIME1              TIME2         STRMNO    PRECIP    DPKRUN    PKRUN     ANTDRY    ALTSTA    DPRECIP

 791   27NOV80:09:35     28NOV80:00:39         .        0.29                 .        67.00
 792   02DEC80:19:16     02DEC80:20:09         .        0.16                 .       115.00
 793   09DEC80:12:18     09DEC80:14:37         .        0.16                 .       160.00                 SR
 794   23DEC80:11:23     23DEC80:14:17         .        0.15                 .          .
 795   15JAN81:12:47     15JAN81:13:06         .        0.02                 .          .                   SR
 796   21JAN81:01:20     21JAN81:11:22         .        0.08                 .       132.25
 797   02FEB81:01:47     02FEB81:10:32        13        0.92              0.0392     278.33
 798   08FEB81:08:52     08FEB81:13:34         .        0.18                 .       142.33
 799   10FEB81:20:48     11FEB81:08:20        43        1.23              0.2070      55.25
 800   17FEB81:00:34     17FEB81:02:55         .        0.07                 .       126.25
 801   19FEB81:12:46     20FEB81:02:29        50        0.84              0.2760      58.00
 802   20FEB81:08:35     20FEB81:14:50         .        0.30                 .         6.00
 803   20FEB81:22:56     21FEB81:02:36         .        0.06                 .         8.00
 804   22FEB81:08:45     22FEB81:12:37         .        0.05                 .        30.25
 805   22FEB81:21:58     23FEB81:15:58        54        0.72              0.3070       9.33
 806   04MAR81:19:15     05MAR81:10:43         .        0.34                 .       219.75
 807   06MAR81:00:30     06MAR81:00:31         .        0.01                 .        13.75
 808   16MAR81:11:15     16MAR81:14:00         .        0.08                 .       250.75
 809   19MAR81:16:36     19MAR81:16:37         .        0.01                 .        74.66
 810   30MAR81:06:22     30MAR81:15:42         .        0.22                 .       253.75
 811   01APR81:15:18     01APR81:16:20         .        0.14                 .        47.66
 812   05APR81:05:11     05APR81:15:01         .        0.36                 .        84.75
 813   09APR81:08:50     09APR81:18:12         .        0.40                 .        89.75
 814   11APR81:09:47     11APR81:10:05         .        0.03                 .        39.50
 815   12APR81:04:16     12APR81:05:15         .        0.02                 .        18.25
 816   12APR81:16:57     13APR81:02:40         .        0.52                 .        11.66
 817   14APR81:03:09     14APR81:08:27         .        0.08                 .        24.50
 818   14APR81:16:41     14APR81:17:42         .        0.14                 .         8.25
 819   17APR81:06:21     17APR81:12:05         .        0.18                 .        60.66
 820   19APR81:22:16     20APR81:05:14         .        0.07                 .        58.25
 821   28APR81:13:51     28APR81:13:55         .        0.06                 .          .
 822   30APR81:18:11     30APR81:23:06         .        0.11                 .        52.75
 823   01MAY81:10:15     01MAY81:12:08       121        1.24              0.0293      11.25
 824   06MAY81:14:04     06MAY81:19:31         .        0.07                 .       122.00
 825   10MAY81:12:33     11MAY81:02:49         .        0.19                 .        89.00
 826   11MAY81:10:09     11MAY81:11:41         .        0.14                 .         7.75
 827   11MAY81:20:50     11MAY81:22:14         .        0.54                 .         9.25
 828   12MAY81:08:29     12MAY81:08:48         .        0.03                 .        10.25
 829   13MAY81:10:20     13MAY81:10:57         .        0.04                 .        25.50
 830   15MAY81:13:01     15MAY81:17:59         .        0.12                 .        50.66
 831   18MAY81:16:03     19MAY81:16:46         .        0.46                 .        70.66
 832   20MAY81:00:36     20MAY81:02:45         .        0.10                 .         7.75
 833   27MAY81:23:58     28MAY81:12:40         .        0.46                 .       189.25
 834   28MAY81:17:31     28MAY81:21:19         .        0.43                 .         4.75
 835   29MAY81:14:49     29MAY81:17:18         .        0.36                 .        17.50
 836   30MAY81:21:06     30MAY81:21:47         .        0.46                 .        27.75
```

APPENDIX B-1

PRECIPITATION DATA

```
--------------------------------------------------- STA=51CR10 ----------------------------------------------------
OBS            TIME1              TIME2      STRMNO   PRECIP   DPKRUN    PKRUN    ANTDRY   ALTSTA   DPRECIP

837                .                  .       233.0    0.39             0.5740        .    51CR01
838   22JUN79:03:30:00   22JUN79:04:00:00         .    0.04                  .        .
839   23JUN79:22:25      24JUN79:00:55            .    0.14                  .    42.50
840   28JUN79:21:45      29JUN79:00:35            .    0.16                  .   117.00
841   30JUN79:15:58      30JUN79:16:20            .    0.31                  .    39.50
842   01JUL79:17:30      01JUL79:17:50            .    0.25                  .    25.00
843   04JUL79:03:20      04JUL79:07:08            .    0.53                  .    57.33
844   13JUL79:19:00      14JUL79:01:30            .    0.41                  .   228.00
845   20JUL79:19:20      20JUL79:20:35            .    0.06                  .   162.00
846   24JUL79:09:30      24JUL79:09:50            .    0.03                  .    85.00
847   25JUL79:15:00      25JUL79:23:45            .    0.09                  .    29.00
848   29JUL79:21:50      30JUL79:05:00            .    1.18                  .        .
849   02AUG79:14:45      02AUG79:17:00            .    0.29                  .    81.75
850   05AUG79:10:55      05AUG79:14:20            .    0.10                  .    66.00
851   10AUG79:18:00      11AUG79:07:05            .    1.59                  .        .
852   17AUG79:11:12      17AUG79:12:00            .    0.21                  .        .
853   21AUG79:11:40      21AUG79:12:48            .    0.93                  .        .
854   23AUG79:12:05      23AUG79:17:25        235.0    0.99             0.0450    48.25
855   25AUG79:13:57      25AUG79:16:20            .    0.14                  .    44.50
856   03SEP79:00:25      03SEP79:05:30            .    0.11                  .   176.00
857   03SEP79:17:00      04SEP79:10:10            .    0.25                  .    11.50
858   05SEP79:11:10      06SEP79:01:10        248.0    3.25      G      1.0300    25.00   51CA01
859   30SEP79:13:30      01OCT79:07:30        274.1    2.20             1.3800        .   51OL01
860   02OCT79:20:40      02OCT79:23:30        275.0    0.40             1.2000    37.25   51CA01
861   05OCT79:07:30      05OCT79:13:10        278.0    1.07             3.3800    56.00   51CA01
862   08OCT79:23:30      09OCT79:04:25        282.0    0.69             0.7450    82.50   51OL01
863   09OCT79:21:35      10OCT79:14:25        283.0    1.25             2.5100    17.00   51OL01
864   22OCT79:23:50      23OCT79:14:30            .    0.02                  .        .
865   08NOV79:23:00      09NOV79:01:45            .    0.04                  .   392.50
866   10NOV79:01:00      11NOV79:23:00            .    0.75                  .    23.25
867   15NOV79:07:37      15NOV79:11:20            .    0.16                  .    80.66
868   15DEC79:08:55      15DEC79:14:00            .    0.28                  .   741.66
869   11JAN80:15:15      11JAN80:23:56         12.0    0.25             0.1494        .
870   14JAN80:10:44      14JAN80:23:28         14.0    0.57             0.1390    58.75
871   18JAN80:04:25      19JAN80:07:55         18.0    0.78             0.7450    77.00
872   19JAN80:07:55      20JAN80:01:10            .    0.30                  .     0.00
873   16FEB80:00:30      16FEB80:03:07            .    0.06                  .        .
874   20FEB80:21:01      20FEB80:22:18            .    0.09                  .   114.00
875   22FEB80:00:49      22FEB80:03:13            .    0.26                  .    26.50
876   25FEB80:02:51      25FEB80:08:11            .    0.22                  .    71.66
877   13MAR80:16:57      13MAR80:20:49            .    0.48                  .        .            SR
878   14MAR80:10:20      14MAR80:16:09            .    0.91                  .    13.50            SR
879   20MAR80:21:46      21MAR80:12:22         81.0    1.15             1.3000   149.75
880   24MAR80:08:45      24MAR80:09:50            .    0.13                  .    68.25
881   28MAR80:16:27      29MAR80:07:09            .    0.74                  .   102.50
882   30MAR80:19:35      31MAR80:14:05         91.0    0.41             0.1195    36.50
883   04APR80:17:29      04APR80:21:51            .    0.22                  .        .
884   07APR80:16:05      07APR80:18:50            .    0.09                  .    66.25
885   08APR80:22:13      09APR80:05:06            .    0.67                  .    27.33
886   14APR80:10:25      14APR80:14:15            .    0.60                  .        .   51CR09
887   24APR80:03:28      24APR80:18:53            .    0.17                  .   229.25
888   26APR80:07:10      26APR80:17:01            .    0.34                  .    36.25
```

APPENDIX B-1

PRECIPITATION DATA

```
------------------------------------------------------------ STA=SICR10 ------------------------------------------------------------
OBS        TIME1              TIME2           STRMNO     PRECIP     DPKRUN     PKRUN     ANTDRY     ALTSTA     DPRECIP

889   27APR80:00:10   27APR80:08:58        .         0.41                    .          7.25
890   27APR80:16:16   27APR80:18:04        .         0.43                    .          7.25
891   28APR80:14:17   28APR80:19:43        .         0.20                    .         20.33
892   29APR80:20:25   30APR80:04:00        .         0.37                    .         24.75
893   30APR80:23:29   01MAY80:06:40    122.0         0.27               0.0447         19.50
894   08MAY80:06:25   08MAY80:09:04        .         0.05                    .        167.75
895   11MAY80:11:49   11MAY80:12:16        .         0.03                    .         74.75
896   17MAY80:23:18   18MAY80:07:08        .         0.80                    .        155.00
897   20MAY80:14:44   21MAY80:06:59        .         1.28                    .         55.50
898   03JUN80:17:11   03JUN80:18:02    155.0         0.71               0.4680              .
899   06JUN80:07:25   06JUN80:08:44        .         0.03                    .         61.33
900   07JUN80:16:39   07JUN80:16:50        .         0.19                    .         32.00
901   09JUN80:22:13   10JUN80:08:46        .         0.10                    .         53.33
902   15JUN80:16:18   15JUN80:17:10        .         0.55                    .        127.50
903   16JUN80:04:30   16JUN80:09:04        .         0.17                    .         11.33
904   23JUN80:20:41   23JUN80:21:34        .         0.22                    .              .
905   03JUL80:06:27   03JUL80:07:02        .         0.24                    .        225.00
906   21JUL80:19:20   21JUL80:19:40        .         0.44                    .              .
907   22JUL80:14:07   22JUL80:23:34        .         0.40                    .         18.50
908   23JUL80:06:21   23JUL80:10:43        .         0.41                    .          6.75
909   04NOV80:10:45   04NOV80:11:37        .         0.02                    .              .
910   09NOV80:15:43   09NOV80:16:15        .         0.06                    .        124.00
911   15NOV80:08:50   15NOV80:09:12        .         0.02                    .        136.50
912   17NOV80:13:43   18NOV80:11:57        .         0.64                    .         52.50
913   24NOV80:00:32   24NOV80:15:33        .         1.14                    .        132.50
914   27NOV80:09:37   28NOV80:01:01        .         0.32                    .         66.00
915   02DEC80:18:48   02DEC80:19:31        .         0.11                    .        113.75
916   09DEC80:14:05   09DEC80:20:48        .         0.15                    .        167.50
917   15JAN81:13:25   15JAN81:13:26        .         0.01                    .              .
918   16JAN81:19:37   16JAN81:19:38        .         0.01                    .         30.25
919   21JAN81:01:20   21JAN81:09:24        .         0.10                    .        101.75                58
920   02FEB81:02:17   02FEB81:08:15        .         0.46                    .        280.75
921   08FEB81:02:23   08FEB81:17:10        .         0.18                    .        138.25
922   10FEB81:14:57   10FEB81:15:15        .         0.02                    .         45.75
923   10FEB81:21:07   11FEB81:13:32        .         0.41                    .          6.00
924   20FEB81:08:35   20FEB81:14:50     51.0         0.30               0.0850              .     SICR09
925   22FEB81:21:58   23FEB81:15:58     54.1         0.72               0.0701              .     SICR09
926   26FEB81:16:01   26FEB81:16:02        .         0.01                    .         72.00
927   28FEB81:05:47   28FEB81:05:48        .         0.01                    .         37.75
928   01MAR81:08:07   01MAR81:08:08        .         0.01                    .         26.75
929   02MAR81:15:19   02MAR81:15:20        .         0.01                    .         31.25
930   03MAR81:06:22   03MAR81:12:43        .         0.20                    .         15.00
931   04MAR81:18:55   05MAR81:10:15        .         0.43                    .         30.25
932   16MAR81:12:25   16MAR81:14:27        .         0.17                    .        266.25
933   30MAR81:06:28   30MAR81:15:36        .         0.24                    .        328.00
934   01APR81:15:18   01APR81:16:26        .         0.13                    .         21.75
935   04APR81:12:56   04APR81:12:57        .         0.01                    .         68.50
936   05APR81:08:43   05APR81:17:52        .         0.43                    .         19.75
937   09APR81:11:57   09APR81:12:40        .         0.10                    .         90.00
938   09APR81:17:34   09APR81:18:11        .         0.15                    .          5.00
939   11APR81:09:08   11APR81:09:09        .         0.01                    .         39.00
940   12APR81:03:30   12APR81:05:17        .         0.02                    .         18.33
```

APPENDIX B-1

PRECIPITATION DATA

```
---------------------------------------------------------- STA=SICR10 ----------------------------------------------------------

 OBS         TIME1                TIME2          STPMNO     PRECIP     DPKRUN     PKRUN     ANTDRY     ALTSTA     DPRECIP

 941    12APR81:16:45     13APR81:02:34         .         0.39                    .        11.50
 942    14APR81:04:17     14APR81:07:16         .         0.05                    .        25.75
 943    14APR81:16:49     14APR81:17:16         .         0.24                    .         9.50
 944    17APR81:06:26     17APR81:11:28         .         0.11                    .        61.25
 945    19APR81:22:54     20APR81:05:49         .         0.05                    .        59.50
 946    23APR81:07:04     23APR81:07:57         .         0.05                    .        73.75
 947    23APR81:20:03     23APR81:21:36         .         0.07                    .        12.66
 948    26APR81:22:43     27APR81:04:58         .         0.16                    .        73.25
 949    30APR81:08:00     30APR81:10:24         .         0.06                    .        75.66
 950    30APR81:18:08     30APR81:23:10         .         0.14                    .         7.75
 951    01MAY81:10:31     01MAY81:18:12         .         0.81                    .        11.33
 952    06MAY81:14:26     06MAY81:20:45         .         0.06                    .       116.25
 953    10MAY81:17:44     11MAY81:02:13         .         0.11                    .        93.00
 954    11MAY81:10:02     11MAY81:11:28         .         0.20                    .         7.75
 955    11MAY81:18:46     11MAY81:19:16         .         0.02                    .         7.33
 956    12MAY81:05:31     12MAY81:06:52         .         0.03                    .        10.25
 957    15MAY81:10:32     15MAY81:18:07         .         0.15                    .        75.75
 958    18MAY81:15:07     19MAY81:16:47         .         0.48                    .        69.00
 959    20MAY81:00:43     20MAY81:01:58         .         0.07                    .         7.75
 960    27MAY81:22:08     28MAY81:09:11         .         0.19                    .       188.75
 961    28MAY81:18:19     28MAY81:19:58         .         0.05                    .         9.25
 962    30MAY81:21:19     30MAY81:22:13         .         0.20                    .        49.75
```

Appendix B-2

Variable Code Names
WETFALL-DRYFALL STATIONS

PRECIP	Total precipitation during period (inches)
PRPDUR	Total period of precipitation (min)
pH	Laboratory pH (standard unids)
TOC	Total organic carbon (mg/L)
SOC	Soluble organic carbon (mg/L)

Note: 1) other codes identified in Appendix A-1
2) Dryfall data reported as mass per square meter rather than per liter.

Appendix B-2

```
------------------------------------------------------------ STA=SIWE01 ------------------------------------------------------------

OBS      TT1             TT2          PRECIP PRPDUR  PH   TSS   COD   NH3   TKN   SKN  NO23    OP   TSP    TP   TOC  SOC  TZN  SZN  TPB  SPB

  1  07JAN80:10:30  15JAN80:14:45    0.88   1198    .   2.8  22.2  0.26  0.65  0.65  0.57  0.02  0.06  0.06   3.9  2.9  690  520    0    0
  2  15JAN80:14:45  19JAN80:10:00    1.11    877  3.8   0.4   9.0  0.22   .     .    0.18  0.00  0.01  0.01   3.0  2.8  132  117    0    0
  3  19JAN80:10:00  01FEB80:10:30    0.16    325  3.9   8.0    .     .    1.53   .     .     .     .    0.11    .    .   260  190  150    0
  4  01FEB80:10:30  11FEB80:09:40    0.14    215  3.8   8.0    .    0.53   .     .    1.30  0.00   .     .     7.3  4.0   25   25    0    0
  5  11FEB80:09:40  29FEB80:09:25    0.58   1059  3.5   6.0    .    0.66  1.03  0.43  1.58  0.01  0.03  0.04   4.4  4.0   15   15    0    0
  6  29FEB80:09:25  14MAR80:10:40    0.48    753  3.8   1.6    .    0.21  0.45  0.45  0.33  0.00  0.06  0.06   3.9  3.9   20   20    0    0
  7  14MAR80:10:40  24MAR80:10:45    2.02   1438  3.4   7.5  23.5  0.25  0.53  0.51  0.20  0.00  0.06  0.06   5.8  2.1   10   10    0    0
  8  24MAR80:10:45  31MAR80:10:25    1.38   1343  3.6   1.0    .    0.04  0.49  0.49  0.29  0.00  0.06  0.04   3.5  3.4    0    .    0    0
  9  31MAR80:10:25  11APR80:12:05    0.66    728  3.8   8.0  11.4  0.78  1.18  1.12  0.37  0.02  0.06  0.05   3.9  3.0   25    .    0    0
 10  11APR80:12:05  21APR80:08:50    0.50    246  3.7   2.0  35.3  0.48  0.66  0.66  0.39  0.00  0.01  0.01   5.3  3.8   25    .    0    0
 11  21APR80:08:50  25APR80:13:00    0.19     63  3.6  48.0  25.0  1.90  3.60  2.41  2.26  0.00  0.07  0.21  16.2  7.3   40   40    0    0
 12  25APR80:13:00  02MAY80:11:25    1.43   1910  3.4   3.6   0.0  0.37  0.61  0.51  0.63  0.00  0.03  0.05   2.8  2.8   20   20    0    0
 13  09MAY80:10:40  16MAY80:11:45    0.56    153  3.4  31.0  62.7  0.47  1.42  1.21  0.79  0.01  0.04  0.07   6.6  6.3   60   60    0    0
 14  16MAY80:11:45  23MAY80:09:50    1.49   1385  3.6   0.0  29.4  0.29  0.44  0.42  0.41  0.01  0.01  0.02   3.1  2.0   10   10    0    0
 15  23MAY80:09:50  30MAY80:10:00    0.18    165  3.2    .     .    0.34  0.81  0.81  1.48  0.01  0.01  0.01    .    .     .    .    .    .
 16  30MAY80:10:00  06JUN80:10:05    0.36     74  3.5   4.0  58.8  0.51  0.85  0.79  0.50  0.01  0.02  0.03   5.6  4.9   10   10    0    0
 17  06JUN80:10:05  13JUN80:10:30    0.16    181  3.4   0.0  16.0  0.88  1.57  1.57  0.79  0.10  0.10  0.11   6.7  6.2   30   30    0    0
 18  27JUN80:13:00  30JUN80:08:30    0.10     11  3.6    .     .    0.50  0.96  0.96  0.61  0.01  0.06  0.06   8.3  8.3   25   25    0    0
 19  30JUN80:08:30  03JUL80:11:00    0.24     26  3.4    .    8.0  0.44  1.15  1.06  1.46  0.01  0.06  0.06   8.2  8.2   50   50    0    0
 20  03JUL80:11:00  07JUL80:09:30    0.71    112  3.8   0.4   9.2  0.08  0.44  0.47  0.34  0.00  0.03  0.06   3.7  3.5   10    0    0    0
 21  07JUL80:09:30  09JUL80:10:00    1.50    233  3.7   1.2   6.4  0.32   .     .    0.47  0.01   .     .     5.0  4.2    .    .    0    0
 22  14JUL80:08:45  18JUL80:15:00    0.19      5  3.3   8.0  22.0  0.93  1.43  1.43  1.51  0.00  0.06  0.06    .    .   150  150    0    0
 23  18JUL80:15:00  24JUL80:09:00    1.15    878  3.7   1.2  10.0  0.20  0.34  0.32  0.37  0.01  0.03  0.03    .    .    10   10    0    0
 24  24JUL80:09:00  06AUG80:09:15    0.67    420  3.7   4.2  13.6  0.40  0.78  0.63  0.47  0.01  0.03  0.05    .    .    40   40    0    0
 25  06AUG80:09:15  14AUG80:09:00    0.72    136  3.4   4.0   6.3  0.53  0.86  0.71  0.81  0.11  0.11  0.14    .    .    30   30    0    0
 26  14AUG80:09:00  25AUG80:10:00    0.47    252  4.3   0.4   3.6  0.16  0.36  0.36  0.37  0.03  0.06  0.06    .    .    30   30    0    0
 27  08SEP80:11:40  18SEP80:11:35    0.83     41  3.9   0.0   9.0  0.30  0.39  0.34  0.47  0.00  0.02  0.03    .   2.4    0    .  150    0
 28  18SEP80:11:35  06OCT80:09:30    1.32    920  4.4   0.0   3.1  0.25  0.37  0.37  1.13  0.01  0.03  0.03    .   1.5   25   25    0    0
 29  06OCT80:09:30  20OCT80:10:00    0.30    333  4.0   0.0  10.7  0.34  0.47  0.47  0.46  0.00  0.06  0.05    .    .    60    .    0    0
 30  20OCT80:10:00  03NOV80:08:40    1.86    985  4.9   1.5    .    0.08  0.11  0.11  0.13  0.00  0.00  0.00    .   0.5    0    0    0    0
 31  03NOV80:08:40  06NOV80:14:45    0.27    254  4.3    .     .    0.08  0.33  0.33  0.13  0.00  0.02  0.02    .    .     0    0    0    0
 32  10NOV80:10:55  18NOV80:09:40    1.15   1475  4.8   1.5   0.0  0.16  0.32  0.23  0.35  0.01  0.02  0.02    .   1.1   15    0    0    0
 33  18NOV80:09:40  25NOV80:16:00    1.23    844  4.8   5.0  12.0  0.14  0.21  0.21  0.22  0.00  0.00  0.00    .    .     0    0    0    0
 34  25NOV80:16:00  01DEC80:11:35    0.31    915  4.6   0.0   0.0  0.24  0.39  0.34  1.50  0.01  0.02  0.02    .    .   110    0    0    0
 35  01DEC80:11:35  10DEC80:09:35    0.26   1226  4.6   9.0   6.8  0.22  0.36  0.36  0.41  0.01  0.01  0.01    .    .    50    .    0    0
 36  05JAN81:14:05  22JAN81:10:10    0.21    710  4.8   1.0    .    0.83  1.23  1.23  2.75  0.02  0.05  0.05    .    .   285  260    0    0
 37  22JAN81:10:10  03FEB81:10:15    0.49    615  4.5   2.0   3.1  0.33  0.38  0.38  0.21  0.02  0.04  0.04    .    .     0    0    0    0
 38  03FEB81:10:15  09FEB81:11:35    0.21    646  4.1   2.0   4.0  0.49  1.02  1.02  0.85  0.01   .    0.01    .    .     .    .    .    0
 39  09FEB81:11:35  12FEB81:12:45    1.01    403  6.1   1.0   3.7  0.23  0.48  0.48  0.23  0.00  0.06  0.06    .    .     0    0    0    0
 40  12FEB81:12:45  24FEB81:11:55    1.62   2256  4.5    .    0.0  0.24  0.43  0.43  0.40  0.00  0.00  0.00    .    .     0    0    0    0
 41  24FEB81:11:55  06MAR81:09:15    0.43    975  4.4    .     .    0.49   .     .    0.67  0.01   .     .      .    .     .    .    .    .
 42  16MAR81:09:07  02APR81:09:00    0.43    777  4.0   1.0  13.3  0.37  1.08  1.05  0.46  0.01  0.03  0.04    .    .    35   35    0    0
 43  02APR81:09:00  06APR81:10:45    0.27    583  3.8   4.0    .    0.29   .     .    1.87  0.02   .     .      .    .    20    0    0    0
 44  06APR81:10:45  10APR81:13:00    0.38   1017  4.5   1.0  12.0  0.25   .     .    0.47  0.01   .     .      .    .     0    0    0    0
 45  10APR81:13:00  16APR81:09:20    0.85   1018  3.8   2.0    .    0.44   .     .    0.72  0.01   .     .      .    .     .    .    .    .
 46  16APR81:09:20  23APR81:08:50    0.25    857  3.8   7.0   4.0  0.52   .     .    1.18  0.01   .     .      .    .   105  105    0    0
 47  23APR81:09:50  27APR81:09:50    0.37    393  3.7   1.0    .    0.60  0.94  0.42  1.68  0.01  0.02  0.03    .    .    65    .    0    0
 48  27APR81:09:50  30APR81:09:55    0.13    154  3.6  23.0    .    1.21   .     .    2.80  0.01   .     .      .    .     .    .    .    .
 49  30APR81:09:55  08MAY81:12:15    1.44   1151  3.7   1.0  12.0  0.43  0.61  0.61  0.73  0.00  0.01  0.02    .    .     0    0    0    0
 50  08MAY81:12:15  14MAY81:12:15    1.03   1444  4.0  14.0   8.0  0.32  0.48  0.48  0.84  0.00  0.01  0.01    .    .     0    0    0    0
 51  14MAY81:12:15  21MAY81:09:40    0.89   1428  3.9   0.0  14.0  0.35  0.55  0.55  0.44  0.00  0.01  0.02    .    .     0    0    0    0
 52  21MAY81:09:40  01JUN81:09:05    1.14    950  5.2   2.0  24.0  0.24  0.53  0.53  0.32  0.00  0.02  0.02    .    .     0    0    0    0
```

Appendix B-3

Variable Code Names
WETFALL-DRYFALL STATIONS

PRECIP	Total precipitation during period (inches)
PRPDUR	Total period of precipitation (min)
pH	Laboratory pH (standard unids)
TOC	Total organic carbon (mg/L)
SOC	Soluble organic carbon (mg/L)

Note: 1) other codes identified in Appendix A-1
2) Dryfall data reported as mass per square meter rather than per liter.

Appendix B-3

-- STA=510001 --

OBS	TI1	TI2	TSS	COD	NH3	TKN	SKN	NO23	OP	TSP	TP	TOC	SOC	TZN	SZN	TPB	SPB
1	20DEC79:13:45	02JAN80:12:45	221.0	1145.0	6.71	16.03	12.56	7.19	0.08	0.39	0.63	48.2	34.0	1027	869	0	0
2	03JAN80:08:30	07JAN80:10:30	19.0	440.0	2.05	4.82	4.82	2.05	0.00	0.24	0.24	22.1	19.8	869	711	0	0
3	07JAN80:10:30	15JAN80:14:45	32.0	289.0	2.53	6.16	6.16	4.58	0.16	0.63	0.63	139.0	44.2	6635	2607	0	0
4	15JAN80:14:45	19JAN80:10:00	4.5	101.0	2.42	.	.	2.86	0.00	0.08	0.16	22.1	20.5	829	632	0	0
5	19JAN80:10:00	01FEB80:10:30	91.0	.	0.47	10.63	8.69	4.87	0.00	0.16	0.32	.	.	316	316	0	0
6	01FEB80:10:30	11FEB80:09:40	169.0	.	4.23	.	.	11.77	0.08	.	.	24.9	15.8	336	158	0	0
7	11FEB80:09:40	29FEB80:09:25	462.0	.	22.08	.	.	22.99	0.79	.	.	67.1	28.6	276	257	0	0
8	29FEB80:09:25	14MAR80:10:40	213.0	.	7.74	11.30	9.00	8.06	0.12	0.20	0.36	40.3	39.1	415	257	395	0
9	24MAR80:10:45	31MAR80:10:25	79.0	.	13.59	17.22	15.66	10.55	0.12	0.24	0.32	30.0	24.5	316	316	0	0
10	31MAR80:10:25	11APR80:12:05	95.0	.	7.11	10.82	9.24	6.71	0.12	0.16	0.32	34.8	19.6	671	553	0	0
11	11APR80:12:05	21APR80:08:50	142.0	.	2.88	8.41	4.15	3.55	0.04	0.12	0.55	48.6	24.5	138	118	0	0
12	21APR80:08:50	25APR80:13:00	47.4	71.9	0.59	8.69	3.16	1.66	0.04	0.12	1.11	72.3	17.4	118	39	0	0
13	25APR80:13:00	02MAY80:11:25	205.0	186.0	6.66	17.22	9.87	3.12	0.39	1.54	1.58	90.4	38.3	217	217	0	0
14	02MAY80:11:25	09MAY80:10:40	774.0	960.0	6.26	21.88	12.20	7.42	1.07	1.07	2.45	114.5	79.8	.	415	0	0
15	09MAY80:10:40	16MAY80:11:45	448.0	557.0	3.28	10.44	5.61	3.20	0.43	0.59	1.26	82.5	37.1	.	395	0	0
16	16MAY80:11:45	23MAY80:04:50	71.0	155.0	3.52	6.83	6.83	1.15	0.24	0.24	0.32	26.1	17.4	454	444	0	0
17	23MAY80:04:50	30MAY80:10:00	221.0	403.0	2.41	8.33	4.70	3.09	0.43	0.43	0.87	47.8	29.2	118	.	0	0
18	30MAY80:10:00	06JUN80:13:05	253.0	525.0	4.62	37.72	25.95	2.37	2.01	2.01	3.44	78.2	50.6	.	.	.	.
19	06JUN80:10:35	13JUN80:10:30	126.0	205.0	1.74	4.58	2.80	1.22	0.20	0.20	0.36	34.8	22.5	79	59	0	0
20	13JUN80:10:30	20JUN80:10:30	63.0	89.3	1.11	5.13	3.40	2.05	0.00	0.20	0.39	27.3	24.5	178	178	0	0
21	20JUN80:10:30	23JUN80:09:15	0.0	81.4	0.95	3.94	3.20	1.30	0.04	0.12	0.20	29.2	20.9	790	790	0	0
22	23JUN80:09:15	27JUN80:13:00	.	.	3.48	.	.	1.22	2.45	2.69	3.16	99.5	38.3	217	217	0	0
23	27JUN80:13:00	30JUN80:08:30	.	.	0.75	4.54	3.36	0.91	0.16	0.28	0.47	28.6	19.6	99	79	0	0
24	30JUN80:08:30	03JUL80:11:00	.	.	0.63	3.16	2.05	0.91	0.12	0.28	0.32	22.1	17.8	118	99	0	0
25	03JUL80:11:00	07JUL80:09:30	.	42.7	0.87	4.07	3.16	0.54	0.20	0.32	0.39	21.7	17.4	178	79	0	0
26	07JUL80:09:30	09JUL80:10:00	.	.	1.11	.	.	1.03	0.16	.	.	19.4	16.2	.	.	0	0
27	09JUL80:10:00	14JUL80:08:45	55.0	39.5	.	6.08	3.24	.	.	0.24	0.47	.	.	474	434	0	0
28	14JUL80:08:45	18JUL80:15:00	79.0	63.2	0.95	3.24	2.37	2.61	0.00	0.32	0.39	.	.	316	316	0	0
29	18JUL80:15:00	24JUL80:09:00	74.0	47.8	1.58	4.34	3.87	1.58	0.55	0.63	0.71	.	.	513	513	0	0
30	24JUL80:09:00	04AUG80:09:15	174.0	82.2	2.86	15.24	4.72	2.45	0.55	0.95	2.05	.	.	671	671	0	0
31	04AUG80:09:15	14AUG80:09:00	45.0	46.8	3.16	25.04	19.12	1.18	.	6.71	6.71	.	.	592	474	0	0
32	14AUG80:09:00	25AUG80:10:00	164.0	648.0	10.11	.	.	2.13	14.30	.	.	.	.	671	.	0	0
33	25AUG80:10:00	08SEP80:11:40	51.0	180.0	2.61	.	.	2.13	0.39	.	.	.	.	158	158	0	0
34	08SEP80:11:40	18SEP80:11:35	158.0	156.0	2.37	6.32	4.34	2.76	0.32	0.55	0.71	.	18.2	197	147	0	0
35	18SEP80:11:35	06OCT80:09:30	142.0	47.2	2.61	6.79	4.40	5.92	0.24	0.47	0.55	.	13.4	158	158	0	0
36	06OCT80:09:30	20OCT80:10:00	122.0	170.0	3.32	8.45	5.85	6.32	0.24	0.63	1.26	.	.	158	158	0	0
37	20OCT80:10:00	03NOV80:08:40	182.0	115.0	2.84	7.03	5.06	6.00	0.16	0.32	0.63	.	11.1	316	.	0	.
38	03NOV80:08:40	06NOV80:14:45	.	.	2.45	3.00	2.76	3.32	0.08	0.16	0.16	.	5.5	0	0	0	0
39	06NOV80:14:45	10NOV80:10:55	55.0	0.0	1.50	2.13	2.13	1.90	0.00	0.16	0.24	.	6.3	158	118	0	0
40	10NOV80:10:55	18NOV80:09:40	182.0	94.8	4.50	6.95	6.08	6.56	0.08	0.16	0.39	.	15.0	276	237	0	0
41	18NOV80:09:40	25NOV80:16:00	95.0	31.6	1.58	2.84	1.82	2.37	0.08	0.08	0.16	.	.	158	.	0	0
42	25NOV80:16:00	01DEC80:11:35	39.0	0.0	0.47	1.82	1.82	3.32	0.00	0.08	0.08	.	.	118	118	0	0
43	01DEC80:11:35	10DEC80:09:35	7.9	103.0	0.79	3.63	2.37	2.45	0.00	0.00	0.24	.	.	79	0	0	0
44	10DEC80:09:35	17DEC80:12:30	32.0	34.5	3.00	4.50	4.50	5.85	0.24	0.24	0.24	.	.	79	.	0	0
45	17DEC80:12:30	22DEC80:09:00	34.0	41.9	10.58	16.27	14.69	15.46	0.16	0.32	0.55	.	.	434	395	0	0
46	05JAN81:14:05	22JAN81:10:10	243.0	.	1.90	15.09	14.22	4.34	0.08	0.39	0.63	.	.	474	434	0	0
47	22JAN81:10:10	03FEB81:10:15	87.0	59.2	7.03	11.53	8.93	4.56	0.08	0.08	0.32	.	.	237	237	0	0
48	03FEB81:10:15	09FEB81:11:35	15.8	164.0	4.19	6.79	6.08	4.82	0.00	0.00	0.16	.	.	.	.	.	.
49	09FEB81:11:35	12FEB81:12:45	23.7	71.1	1.50	3.63	3.40	1.82	0.00	0.24	0.32	.	.	.	.	.	.
50	12FEB81:12:45	24FEB81:11:55	.	.	6.64	4.95	4.95	5.06	0.08	0.08	0.08	.	.	276	237	0	0
51	24FEB81:11:55	06MAR81:09:15	.	.	1.90	.	.	7.74	0.00	.	.	.	.	.	.	.	.
52	06MAR81:09:15	16MAR81:09:07	126.0	379.0	3.16	5.21	3.48	8.85	0.08	0.47	2.05	.	.	316	237	0	0
53	16MAR81:09:07	02APR81:09:00	592.0	226.0	2.24	12.64	8.24	13.20	0.24	0.24	0.39	.	.	553	474	0	0
54	02APR81:09:00	06APR81:10:45	101.0	75.0	1.42	4.50	2.84	3.71	0.16	0.24	0.24	.	.	276	237	0	0

Appendix B-3

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------------------------------------------------------------ STA=SIUF01 --------------------------------------------------------------

 OBS      TT1               TT2            TSS    COD     NH3     TKN    SKN    NO23    OP     TSP    TP      TOC   SOC   TZN   SZN   TPH   SPH

 55   06APR81:10:45   10APR81:13:00    118    31.6    0.47    4.50   3.32   1.82   0.08   0.32   0.47     .     .      0     0     0     0
 56   10APR81:13:00   16APR81:09:20     71      .     3.12      .      .    3.71   0.24     .      .      .     .      .     .     .     .
 57   16APR81:09:20   23APR81:08:50    316   348.0    5.53   16.76   8.05   5.69   0.24   0.39   1.36     .     .    276   276     0     0
 58   23APR81:08:50   27APR81:09:50    284   150.0    6.27   11.06   6.46   5.06   0.16   0.24   0.79     .     .    277     .     0     0
 59   27APR81:09:50   30APR81:09:55    355   663.0    2.24   21.54   5.92   2.24   0.08   0.32   2.40     .     .      .     .     .     .
 60   30APR81:09:55   06MAY81:12:15    107   310.0    2.61   14.69   7.42   4.44   0.16   0.63   1.26     .     .    276   276     0     0
 61   06MAY81:12:15   14MAY81:12:15    156   150.0      .    11.41   3.70   3.68   0.08   0.08   0.79     .     .    277   277     0     0
 62   14MAY81:12:15   21MAY81:09:40     79   180.0    3.55    3.50   5.53   2.21   0.00   0.24   0.47     .     .      0     0     0     0
 63   21MAY81:09:40   01JUN81:09:05     41   340.0    2.13   12.32   7.66   4.11   0.47   0.79   1.42     .     .      0     0     0     0
```

Appendix C. Biochemical oxygen demand data

Site	Date	Filtered/Unfiltered[a] (U/F)	Inhibited/Uninhibited[b] (I/U)	BOD_{20}[c] (mg/L)	K_{10}[d] ($days^{-1}$)
1	3-05-80	U	U	5.6	0.027
		U	I	3.6	0.035
		F	U	4.9	0.058
		F	I	4.0	0.060
	3-25-80	U	U	2.1	0.15
		U	I	2.0	0.15
		F	U	1.0	0.12
		F	I	0.9	0.12
2	3-05-80	U	U	5.6	0.043
		U	I	5.2	0.042
		F	U	7.6	0.018
		F	I	5.6	0.060
	3-25-80	U	U	3.0	0.036
		U	I	2.5	0.052
		F	U	1.9	0.041
		F	I	1.5	0.012
7	4-29-81	U	I	3.6	0.058
8	4-29-81	U	I	3.4	0.055

a - filtered samples passed through 0.45 micron membrane filter

b - nitrification inhibitor added to some samples; associated results represent carbonaceous BOD only

c - BOD exerted after 20 days; incubation temperature 20°C

d - estimate based upon additional measurements during incubation period

Appendix D

PESTICIDE ANALYSES[a]

Occoquan Watershed Runoff

Sampling Date: August 13, 1979

Compound (μg/l)	Location					
	CB-1[b]	CB-2	CB-4	CB-7	CB-8	CB-9
HCB	0.003	0.013	ND[c]	0.003	ND	ND
α-BHC	ND	ND	ND	0.036	ND	ND
Diazinon	ND	ND	0.050	ND	ND	ND
Lindane	0.006	ND	ND	0.004	0.082	ND
Heptachlor	ND	ND	ND	0.042	ND	ND
Aldrin	0.006	ND	ND	ND	0.082	ND
Dacthal	ND	ND	0.050	ND	ND	ND
Heptachlor Epoxide	ND	ND	ND	0.004	0.002	0.001
pp-DDE	0.005	0.008	0.016	0.004	0.637	0.005
Dieldrin	ND	ND	ND	ND	ND	0.001
Endrin	ND	0.001	ND	ND	ND	0.001
op-DDT	0.029	ND	ND	ND	ND	0.003
pp-DDD	0.004	ND	0.005	0.009	0.030	0.014
pp-DDT	0.049	0.034	ND	0.016	0.332	ND
Methoxychlor	0.005	0.219	ND	0.005	ND	0.024
Mirex	0.003	ND	ND	0.003	0.007	ND
Chlordane[d]	2.610	ND	ND	0.272	1.150	ND
Butyl Benzyl[d] Phthalate	0.039	ND	0.098	0.089	ND	1.002
PCB's (1242-1254)[d]	0.315	0.239	0.544	0.223	0.464	0.239

---

[a] GLC conditions: 6 ft., 1/4 inch glass column; 5% OV 105, 80/100 mesh on Supelcoport. Temperatures: Column 210°C, injection 250°C, ^{63}Ni, detector 325°C.

[b] Sampling date August 28, 1979.

[c] ND = Not detected.

[d] mg/l

Appendix D

HERBICIDE ANALYSES[a]

Occoquan Watershed Runoff

Sampling Date: August 13, 1979

Location	Silvex	Compound (μg/l) 2,4-D	2,4-5-T	Picloram
CB-1[a]	ND[c]	0.08	0.02	ND
CB-2	ND	0.13	0.03	ND
CB-7	ND	0.32	0.01	ND
CB-8	T[d]	ND	T	ND

[a] GLC Conditions: 6 ft., 1/4 inch glass column; 5% OV 105, 80/100 mesh on Supelcoport, Temperatures: Column 210 °C, injection 250 °C, ^{63}N, detector 325 °C.

[b] Sampling date August 28, 1979.

[c] ND = Not detected

[d] T = Trace, < 0.01 μg/L

Appendix D

HERBICIDE ANALYSES[a]
Occoquan Watershed Runoff
Sampling Date: March 5, 1980

Location	Sample No.	Compound, µg/l			
		2-4-D	2,4,5-T	Methyl Silvex	Picloram
Distilled Water Blank		ND[b]	ND	0.19	0.28
CB-2	2A	ND	ND	0.36	0.10
CB-2	2B	1.06	0.32	0.51	0.09
CB-4	4A	ND	0.34	0.53	0.07
CB-4	4B	ND	ND	0.70	ND
CB-7	7A	0.13	ND	0.47	0.40
CB-7	7B	1.00	ND	0.27	0.24
CB-8	8A	0.48	ND	0.38	0.27
CB-8	8B	0.08	ND	0.25	0.20
CB-9	9A	0.90	ND	ND	0.25
CB-9	9B	ND	ND	ND	0.20
Reservoir	10A	ND	ND	ND	0.23
Reservoir	10B	ND	ND	ND	0.40

[a] GLC conditions: 6 ft., 1/4 inch glass column, 5% OV 105 on 80/100 Supelcoport; ^{63}Ni detector. Water extracted with ethyl ether and derivatized with BF_3.

[b] ND = Not detected.

Appendix D

PESTICIDE ANALYSES[a]

Occoquan Watershed Runoff

Sampling Date: March 5, 1980

Location	Sample	Flame Photometric Detector		
			Phosphorus Filter	
		Sulfur Filter	Cygon (μg/l)	Mocap
Distilled Water Blank		No Peaks	ND[b]	ND
CB-2	2A	No Peaks	ND	ND
CB-2	2B	No Peaks	0.80	ND
CB-4	4A	No Peaks	ND	ND
CB-4	4B	No Peaks	ND	ND
CB-7	7A	No Peaks	0.05	0.28
CB-7	7B	No Peaks	ND	0.05
CB-8	8A	No Peaks	0.13	0.65
CB-8	8B	No Peaks	0.13	0.65
CB-9	9A	No Peaks	0.22	0.82
CB-9	9B	No Peaks	ND	ND
Reservoir	10A	No Peaks	ND	ND
Reservoir	10B	No Peaks	ND	ND

[a] GLC Conditions: 6 ft., 1/4" glass column, 5% OV 105 on 80/100 supelcoport; ^{63}Ni detector. Water extracted with ethyl acetate/10% benzene.

[b] ND = Not detected.

Appendix D

PESTICIDE ANALYSES[a]
Occoquan Watershed Runoff
Sampling Date: March 5, 1980
(Results reported in ug/l)

Location	Sample	Mocap	HCB or Phorate	PCNB or Diazoxon	BHC	Lindane	Ethyl or Methyl Parathion	Dimethylate or Cygon	Captan	Dursban	Dacthal	Hepta-chlor Ep.	Folpet	Endo-sulfan	pp-DDE	pp-DDT	Dieldrin	Pyrethrins	Methoxy-chlor
Distilled Water Blank		ND[b]	ND	ND	T[c]	ND	ND	ND	ND	ND	T	T	0.01	T	ND	T	ND	ND	ND
CB-2	2A	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	T	ND	ND	ND	ND
CB-2	2B	ND	ND	ND	ND	T	ND	ND	ND	ND	T	ND	ND	ND	T	ND	ND	0.07	ND
CB-4	4A	T	ND	0.26	0.02	ND	ND	ND	ND	ND	T	ND	0.01	T	T	0.04	ND	T	T
CB-4	4B	T	T	0.02	0.06	T	ND	ND	ND	ND	ND	ND	0.01	ND	ND	0.01	ND	2.26	ND
CB-7	7A	ND	0.03	ND	0.06	T	ND	ND	ND	ND	T	T	ND	T	T	T	ND	0.22	ND
CB-7	7B	ND	T	0.10	0.07	ND	ND	T	ND	0.01	T	T	T	T	T	ND	ND	0.67	ND
CB-8	8A	ND	ND	ND	0.02	0.04	ND	ND	ND	ND	ND	T	ND	T	ND	ND	ND	0.69	ND
CB-8	8B	ND	T	ND	0.04	ND	T	ND	ND	0.01	T	ND	ND	T	T	0.02	ND	0.01	T
CB-9	9A	0.05	0.01	0.02	0.08	ND	ND	ND	0.27	ND	T	T	0.05	ND	0.01	0.02	T	0.26	ND
CB-9	9B	0.06	ND	ND	0.04	ND	ND	ND	ND	ND	T	ND	ND	T	T	T	T	ND	0.08
Reservoir	10A	T	0.02	0.02	T	ND	ND	T	ND	ND	T	ND	ND	ND	T	T	ND	ND	1.00
Reservoir	10B	ND	T	ND	T	ND	ND	ND	ND	ND	ND	ND	ND	ND	T	ND	ND	2.00	T

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[a] GLC conditions: 6 ft., 1/4 inch glass column, 5% OV 105 on 80/100 Supelcoport; Water extracted with hexane/benzene. EC detector.

[b] ND = Not Detected.

[c] T = Trace, <0.01 ug/l.

[d] Not detected in any sample: op-DDT, triflurin, heptachlor, kelthane, ethion, endrin, mirex.

Appendix D

PESTICIDE ANALYSES[a]

Occoquan Watershed Runoff
Sampling Date: March 5, 1980
(Results reported in µg/L)

Location	Sample	Chlordane	1242 1254 1260 PCB Mix	Fenthion	Tedion	Malathion	Perthane	Ronnel	Phthalates						Peak[d] Retention time(min)
									Dimethyl	Dibutyl	Diethyl	Butyl Benzyl	Dioxtyl	Di-N-oxtyl	
Distilled Water Blank		ND[b]	0.04	ND	ND	ND	ND	ND	19.37	ND	0.34	2.86	1787.8	ND	-
CB-2	2A	ND	12.19	ND	ND	ND	ND	ND	23.25	7.87	0.54	0.09	ND	352.75	-
CB-2	2B	ND	ND	ND	ND	ND	ND	ND	29.09	10.67	13.49	T[c]	1465.07	ND	-
CB-4	4A	0.18	0.74	ND	ND	ND	T	ND	42.75	2.27	2.22	ND	128.93	ND	-
CB-4	4B	ND	0.07	ND	ND	ND	ND	0.02	11.17	ND	0.14	ND	81.05	ND	-
CB-7	7A	0.02	0.27	ND	ND	0.12	T	T	66.34	0.87	1.11	0.30	977.63	ND	16.44
CB-7	7B	0.10	0.26	ND	ND	ND	ND	0.01	3.15	0.85	22.01	0.23	40.36	270.67	16.67
CB-8	8A	0.11	0.09	ND	ND	ND	ND	ND	24.24	0.11	1.59	ND	539.83	ND	16.57
CB-8	8B	0.02	0.04	0.86	T	0.05	ND	0.01	29.05	0.75	ND	ND	841.01	ND	16.66
CB-9	9A	0.10	T	ND	ND	ND	ND	ND	3.02	5.86	0.79	ND	638.35	ND	-
CB-9	9B	ND	ND	ND	ND	ND	ND	ND	11.18	ND	0.41	ND	842.56	ND	-
Reservoir	10A	0.11	0.05	ND	ND	ND	ND	ND	19.37	2.87	0.33	ND	1787.8	ND	-
Reservoir	10B	0.02	0.03	ND	ND	ND	ND	ND	35.49	ND	ND	ND	108.92	ND	-

[a] GLC Conditions: 6 ft., 1/4" glass column, 5% OV 105 on 80/100 supelcoport; water extracted with hexane/benzene. EC detector.

[b] ND = Not Detected.

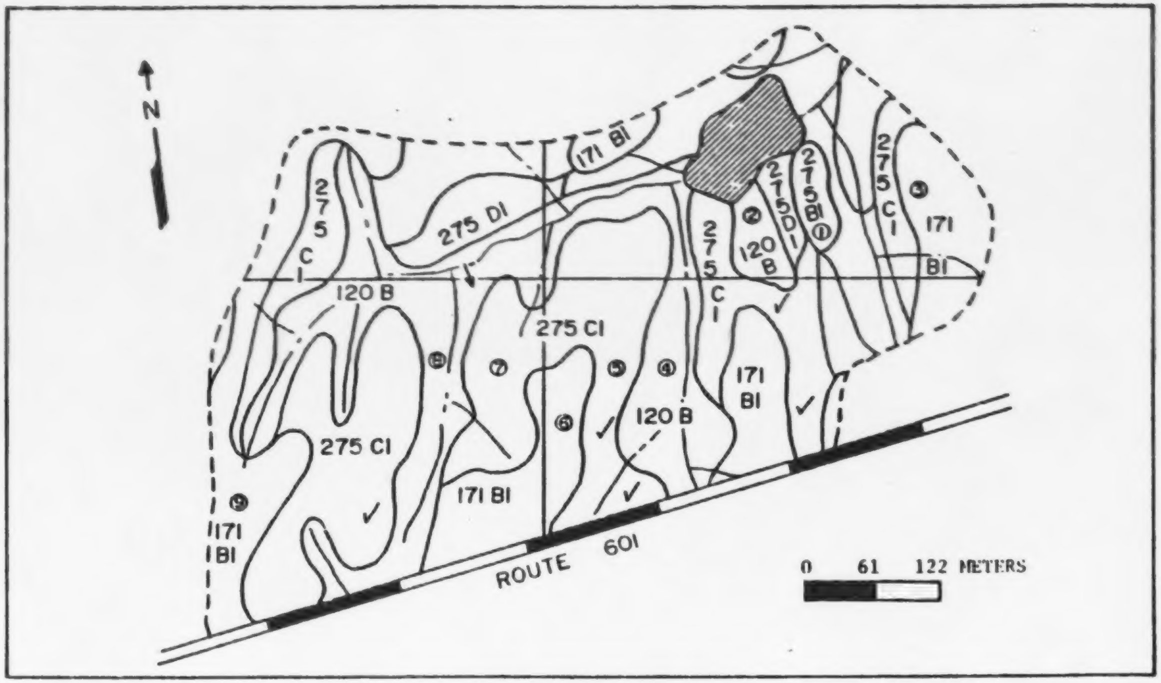
[c] T = trace, <0.01 µg/L.

[d] Large peaks of undefined origin were found in some samples.

Appendix E-1. Analysis of Soils at Study Sites.[a]

Site	Sample No.	Soil Map Symbol	Horizon	Depth (cm)	Sand						Silt[b]	Clay[c]	Textural Class
					VC	C	M	F	VF	Total			
1-4	1	275B1	A	0-13	3.2	3.9	6.6	9.1	10.2	32.9	45.6	21.5	l
	2	120B1	A	0-20	2.6	3.3	5.7	9.7	12.5	33.8	49.6	16.6	l-sil
	3	171B1	A	0-20	1.8	2.8	4.9	7.8	15.1	32.3	48.3	19.3	l
	4	120B1	A	0-36	1.4	3.1	5.8	8.4	7.5	26.2	49.1	24.6	l-sil
	5	275C1	A	0-20	2.0	4.0	6.3	8.3	9.8	30.4	50.4	19.2	sil-l
	6	171B1	A	0-18	1.2	3.5	7.0	9.1	7.2	27.9	46.4	25.7	l-cl
	7	275C1	A	0-23	4.5	6.0	7.4	9.2	8.9	36.0	46.5	17.5	l
	8	120B	A	0-46	1.3	3.2	4.6	6.2	7.0	22.3	56.4	21.3	sil
	9	171B	A	0-18	3.5	4.6	8.4	10.4	7.6	34.5	43.3	22.2	l
	10	171B	A	0-23	3.4	5.5	6.5	8.7	8.4	32.5	44.8	22.7	l
	11	120B	A	0-51	1.7	2.5	4.5	7.8	7.1	23.6	54.8	21.6	sil
	12	275C1	A	0-25	10.8	11.3	11.0	10.3	6.1	49.5	38.4	12.1	l
5	13	14B	A	0-33	1.6	1.7	3.7	6.0	9.0	22.0	58.8	19.2	sil
	14	73B1	A	0-20	2.2	2.1	4.2	8.3	10.1	27.0	51.5	21.5	sil-l
	15	62B1	A	0-18	.8	2.2	4.8	9.3	8.7	25.8	49.4	24.7	l-sil
	16	171B1	A	0-23	1.2	2.0	3.4	8.7	9.7	25.0	57.1	17.9	sil
	17	78B1	A	0-23	.9	1.7	3.1	4.6	3.3	13.6	67.5	18.9	sil
7-8	1	63E1	A	0-36	2.4	4.7	10.1	12.3	8.2	37.8	49.6	12.6	sil-l
	2	460C1	A	0-23	2.6	6.9	12.1	13.5	5.7	40.9	45.9	13.3	l
	3	(Fill)	A&B	0-25	7.1	12.0	14.1	13.8	7.8	54.8	27.8	17.4	sl
	4	37B1	A	0-23	3.9	7.3	10.8	9.7	2.9	34.6	53.1	12.3	sil
9	1	Me	A	0-25	2.1	2.3	2.8	6.4	3.7	17.3	56.3	26.4	sil-sicl
	2	Sf	A	0-28	1.1	1.7	2.4	8.0	9.1	22.2	71.3	6.4	sil
	3	Fg	A	0-20	.3	1.5	4.5	9.4	11.4	27.0	68.3	4.6	sil
10	1	Pb	A	0-25	7.5	4.7	5.0	8.2	5.9	31.4	47.9	20.7	l-sil

a - sampling date summer, 1979   b - determined by sieving   c - determined by pipette


N
275 C I
120 B
275 DI
171 BI
275 CI
120 B
171 BI
275 C I
275 DI
275 BI
120 B
275 C I
171 BI
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
275 CI
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171 BI
ROUTE 601
0 61 122 METERS

Figure E-1. Soil sample locations at sites 1-4.

Appendix E-2

Cation Exchange Capacities
at study sites

Site	Sample No.	Soil Map Symbol	CEC (meq Mg per 100 g. soil)	
			A Horizon	B Horizon
1-4	1	275B1	7.8	3.3
	2	120B1	3.8	2.2
	3	171B1	5.4	3.7
	4	120B1	4.7	4.6
	5	275C1	4.3	2.3
	6	171B1	6.0	---
	7	275C1	5.2	2.3
	8	120B	4.6	3.6
	9	171B	8.9	4.1
	10	171B	1.7	3.3
	11	171B	4.6	5.6
	12	120B	4.2	5.6
5	13	14B	2.9	3.8
	14	73B1	4.9	3.3
	15	62B1	5.3	5.1
	16	171B1	4.1	5.1
	17	78B1	7.6	6.8
7-8	1	63E1	1.4	1.9
	2	460C1	1.5	2.5
	3	(mixed A & B)		2.3
	4	371B1	1.6	1.5

Appendix F

Site Management Activities

Site 1

May 1, 1975 - June 9, 1980	134 cattle; 18 horses
June 10, 1980 - May 31, 1981	89 cattle; 18 horses

Site 2

May 1, 1979	Applications: Liquid N, 900 gals; 10-20-20, 325 lbs/acre; Paraquat, 6 gal.; Atrazine, 75 gal.
Dec. 1, 1979	Harvest
Jan. 2, 1980	Field harrowed
Feb. 8, 1980	Liquid manure applied, 1800 gal. (see Appendix I)
Feb. 28, 1980	Lime, 1 ton/acre (partial coverage)
April, 1980	Field disced
April, 17, 1980	Liquid manure applied, 7 tons
April 25, 1980	corn planted 10-20-20 applied, 200 lbs/acre
May 2, 1980	Applications: Liquid N, 30 gal.; Attrex, 1-1/2 lbs/acre
Sep. 17, 1980	Harvest
Oct. 1, 1980	Heavy discing
Oct. 10, 1980	Lime applications, 1 ton/acre
Nov. 1, 1980	Liquid manure application
Dec., 1980	Field disced
Jan., 1981	Liquid manure application, 6 tons/acre
Feb., 1981	Liquid manure application, 6 tons/acre
March, 1981	Liquid manure application, 6 tons/acre
April, 1981	Field disced, 4" depth, 1 pass
April 15, 1981	Applications: 11-53-0, 270 lbs/acre; Attrex, 1.66 lbs/acre; Primcep, 1.66 lbs/acre

Site 4

Sep. 6-10, 1979	Emergency spillway overtopped
July 9, 1980	Staff gage installed
Sep. 2, 1980	Bathymetric survey of pond

Site 10

Fall, 1978	High calcium lime applied, 2 tons
May 1, 1979	Applications: diammonium phosphate, 150 lbs/acre; potash, 140 lbs/acre borate, 10 lbs/acre ammonium sulfate, 200 lbs/acre liquid N, 60 lbs/acre Atrex, 1.5 lbs/acre Dual, 1.5 pints/acre
Oct. 31, 1979	Corn harvested
April 25, 1980	Applications: diammonium phosphate (18-46-0), 100 lbs/acre potash (0-0-60), 100 lbs/acre ammonium sulfate (20-0-0), 200 lbs/acre
May 3, 1980	Applications: liquid N, 70 lbs/acre Dual, 2 pints/acre Attrex, 2 lbs/acre Furadan, 8-10 lbs/acre
May 23, 1980	corn 2"high
June 25, 1980	corn 3' high
July 11, 1980	corn 6' high
Sep. 17, 1980	corn 10' high
Oct. 10, 1980	corn harvested
Dec. 10, 1980	field disced
Jan. 10, 1981	field disced
April 1, 1981	Applications: Fertilizer (18-46-0), 100 lbs/acre (20-0-0), 200 lbs/acre (0-0-60), 150 lbs/acre
April 28, 1981	Applications: Liquid N, (30%), 50 lbs/acre Attrex, 1.75 lbs/acre Dual, 2 pints/acre 2-4-D, 0.5 lbs/acre

APPENDIX G

VARIABLE CODE NAMES
METEOROLOGICAL DATA

CODE	PARAMETER
STA	Station Identification Number (51MEXX)
DATE	Date of Record (YYMMDD)
CHRTNO	Chart Reference Number
RADMEAN	Mean Daily Radiation (Langleys/min)
RADMAX	Maximum Daily Radiation (Langleys/min)
RADDUR	Approximate Duration of Radiation (hrs)
RHMEAN	Mean Daily Relative Humidity (%)
RHMIN	Minimum Daily Relative Humidity (%)
RHMAX	Maximum Daily Relative Humidity (%)
TMPMEAN	Mean Daily Temperature (°C)
TMPMIN	Minimum Daily Temperature (°C)
TMPMAX	Maximum Temperature (°C)
EVAP	Net Evaporation Over Time Interval (inches)
WINDMEAN	Mean Wind Speed Over Time Interval (km/hr)
INTRVL	Time Interval Between Records (hrs)

METHODS OF CALCULATION

METEOROLOGICAL STATION DATA

PYRANOGRAPH	A mean radiation value (langleys/min) is computed using the instantaneous values at two hour intervals. For smaller areas the values at one hour intervals are used to provide better resolution. The maximum radiation level observed and the duration of observable radiation are also recorded.
RELATIVE HUMIDITY	The minimum and maximum percent relative humidity are recorded for a given daily period, which is taken as midnight to midnight on the day of interest. The daily mean value is the arithmetic mean of the minimum and maximum values.
TEMPERATURE	The minimum and maximum temperature in degrees Celsius are recorded for a given daily period, which is taken as midnight to midnight on the day of interest. The daily mean value is the arithmetic mean of the minimum and maximum values.
NET EVAPORATION	The recorded value represents the change in water level (inches) in a Weather Bureau Class A evaporation pan. Positive values represent a net decrease in water level in the evaporation pan during the observation period; negative values indicate a net increase (due to precipitation).
MEAN WIND SPEED	The increase noted on the totalizing anemometer (Km) is average arithmetically over the time period (hrs) to obtain the mean value reported.

- -

Raw data and instrument charts are on file at the Occoquan Watershed Monitoring Laboratory.

Appendix G

Meterological Data

STA=SIMF01

OBS	DATE	CHRTNO	RADMEAN	RADMAX	RADDUR	RHMEAN	RHMIN	RHMAX	TMPMEAN	TMPMIN	TMPMAX	EVAP	WINDMEAN	INTRVL
1	790709		.	0.85	.	.	.	.	.	.	.	.	.	.
2	790710		0.39	0.91	14.0	75.0	56	94	17.5	13.0	22.0	.	.	.
3	790711		0.78	1.25	14.0	69.5	43	96	20.3	12.5	28.0	.	.	.
4	790712		0.63	1.20	14.0	70.0	46	94	22.8	17.0	28.5	.	.	.
5	790713		0.52	1.36	14.0	71.0	48	96	24.3	18.0	30.5	.	.	.
6	790714		0.39	1.04	14.0	71.5	48	95	22.3	18.5	26.0	.	.	.
7	790715		0.69	1.15	14.0	74.5	55	94	23.3	18.5	28.0	.	.	.
8	790716	1/2	0.51	1.18	14.0	69.5	45	94	24.3	18.5	30.0	.	2.40	163
9	790717	2	0.63	1.15	14.0	65.5	39	92	23.8	18.5	29.0	.	.	.
10	790718	2	0.30	0.80	14.0	76.0	58	96	21.3	17.5	25.0	.	.	.
11	790719	2	0.50	1.13	14.0	74.0	51	97	20.8	15.5	26.0	.	.	.
12	790720	2	0.32	0.75	14.0	76.0	56	96	21.5	17.0	26.0	.	.	.
13	790721	2	0.34	1.17	14.0	75.5	54	97	21.3	17.5	25.0	.	.	.
14	790722	2	.	.	.	76.5	57	96	22.0	17.5	26.5	.	.	.
15	790723	3	.	1.30	.	.	.	.	.	.	.	.	2.96	167
16	790724	3	.	.	.	.	.	.	.	.	.	.	.	.
17	790725	3	.	.	.	.	.	.	.	.	.	.	.	.
18	790726	3	.	.	.	.	.	.	.	.	.	.	.	.
19	790727	3	.	1.25	.	.	50	.	.	.	26.5	.	.	.
20	790728	3	0.30	1.22	14.0	71.0	51	91	22.5	16.5	28.5	.	.	.
21	790729	3	0.37	1.19	14.0	78.5	65	92	21.5	18.0	25.0	.	.	.
22	790730	3/4	0.29	0.83	13.0	77.5	64	91	21.0	18.0	24.0	1.3	3.59	168
23	790731	4	0.25	1.10	13.0	66.0	42	90	24.0	18.0	30.0	.	.	.
24	790801	4	0.60	1.05	13.0	66.5	44	89	25.0	19.0	31.0	.	.	.
25	790802	4	0.35	1.08	14.0	68.0	46	90	24.0	18.0	30.0	.	.	.
26	790803	4	0.36	1.14	14.0	72.5	55	90	22.3	18.5	26.0	.	.	.
27	790804	4	0.67	1.07	13.5	64.0	38	90	22.0	17.0	27.0	.	.	.
28	790805	4	0.68	1.15	14.0	64.0	40	88	22.8	17.0	28.5	.	.	.
29	790806	4/5	0.62	1.18	13.0	67.0	46	88	22.5	17.5	27.5	0.0	3.43	170
30	790807	5	0.55	1.07	13.0	67.5	46	89	21.5	16.0	27.0	.	.	.
31	790808	5	0.52	1.01	12.0	69.0	48	90	24.5	18.0	31.0	.	.	.
32	790809	5	0.61	1.15	13.0	69.0	48	90	24.0	19.5	28.5	.	.	.
33	790810	5	0.54	1.02	13.0	64.0	37	91	24.5	17.0	32.0	.	.	.
34	790811	5	0.44	1.02	14.0	66.0	40	92	22.5	15.0	30.0	.	.	.
35	790812	5	0.14	0.42	12.0	82.5	74	91	15.0	14.5	15.5	.	.	.
36	790813	5/6	0.72	1.26	14.0	63.0	36	90	18.0	11.0	25.0	-0.8	5.25	173
37	790814	6	0.64	1.08	12.0	63.0	34	92	17.8	10.0	25.5	.	.	.
38	790815	6	0.66	1.16	13.0	66.0	43	89	13.8	9.0	18.5	.	.	.
39	790816	6	0.58	1.25	12.0	65.5	37	94	12.8	6.5	19.0	.	.	.
40	790817	6	0.50	1.23	13.0	63.0	32	94	12.8	5.0	20.5	.	.	.
41	790818	6	0.	0.70	13.0	80.0	70	90	15.0	13.0	17.0	.	.	.
42	790819	6	0.39	1.08	13.0	69.0	47	91	21.0	15.0	27.0	.	.	.
43	790820	6/7	0.57	1.10	14.0	70.5	51	90	20.0	14.5	25.5	1.1	4.53	166
44	790821	7	0.20	0.90	12.0	77.0	62	92	18.8	17.0	20.5	.	.	.
45	790822	7	0.43	1.22	13.0	71.5	49	94	16.8	10.0	22.5	.	.	.
46	790823	7	0.18	0.82	13.0	82.0	72	92	19.8	16.0	23.5	.	.	.
47	790824	7	0.50	1.18	13.0	74.0	56	92	23.3	19.5	27.0	.	.	.
48	790825	7	0.34	1.21	13.0	71.0	50	92	23.8	19.0	28.5	.	.	.
49	790826	7	0.54	1.08	.	73.0	54	92	23.3	18.5	28.0	.	.	.
50	790827	7/8	0.40	1.11	13.0	71.0	50	92	23.5	18.5	28.5	-1.2	3.21	167
51	790828	8	0.46	1.05	13.0	76.5	60	93	22.0	17.5	26.5	.	.	.
52	790829	8	0.30	0.85	13.0	79.0	66	92	22.0	18.5	25.5	.	.	.
53	790830	8	0.49	1.10	13.0	73.5	54	93	22.0	17.0	27.0	.	.	.
54	790831	8	0.61	1.05	13.0	66.5	41	92	22.3	16.0	28.5	.	.	.

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OBS	DATE	CHRTNO	RADMEAN	RADMAX	RADDUR	RHMEAN	RHMIN	RHMAX	TMPMEAN	TMPMIN	TMPMAX	EVAP	WINDMEAN	INTRVL
55	790901	8	0.55	1.00	13.0	72.5	53	92	20.8	15.5	26.0	.	.	.
56	790902	8	0.51	1.22	13.0	71.0	52	98	22.3	17.5	27.0	.	.	.
57	790903	8	0.30	1.05	17.5	.	.	92	.	18.0	.	.	.	.
58	790904	8/9	.	1.13	.	68.0	46	98	.	.	27.0	0.20	3.46	143
59	790905	9	0.88	0.18	11.5	86.5	82	91	20.0	18.0	22.0	.	.	.
60	790906	9	0.67	1.03	12.0	66.0	42	90	22.5	18.0	27.0	.	.	.
61	790907	9	0.48	1.00	12.5	68.0	47	89	20.5	15.0	26.0	.	.	.
62	790908	9	0.56	1.25	12.0	64.5	45	84	13.3	7.5	19.0	.	.	.
63	790909	9	0.65	1.04	12.0	65.0	36	94	14.0	8.0	20.0	.	.	.
64	790910	9/10	0.58	1.10	12.0	69.5	47	92	13.3	5.5	21.0	-0.80	5.15	144
65	790911	10	0.55	0.95	12.0	68.0	44	92	17.0	9.0	25.0	.	.	.
66	790912	10	0.49	0.90	12.0	70.5	49	92	18.3	13.0	23.5	.	.	.
67	790913	10	0.29	0.93	12.0	72.0	52	92	16.0	10.0	22.0	.	.	.
68	790914	10	0.42	1.02	12.0	74.0	56	92	20.5	15.0	26.0	.	.	.
69	790915	10	0.58	1.17	12.0	68.5	44	93	14.0	9.0	19.0	.	.	.
70	790916	10	0.62	1.04	12.0	67.0	40	94	13.0	8.0	19.5	.	.	.
71	790917	10/11	0.63	1.00	12.0	63.0	32	94	15.5	6.0	25.0	0.75	4.44	172
72	790918	11	0.56	1.08	11.5	65.0	38	92	15.0	7.5	24.0	.	.	.
73	790919	11	0.65	1.08	12.0	63.0	34	92	11.0	3.0	19.0	.	.	.
74	790920	11	0.61	1.00	12.0	70.0	45	93	[illegible]	3.0	16.5	.	.	.
75	790921	11	0.05	0.12	10.5	90.0	88	92	14.0	11.0	18.5	.	.	.
76	790922	11	0.16	0.52	12.0	82.0	74	90	16.0	13.5	18.5	.	.	.
77	790923	11	0.60	1.09	11.5	67.0	42	92	14.5	11.0	18.0	.	.	.
78	790924	11/12	0.49	0.98	12.0	67.5	41	94	13.0	6.0	20.0	-1.65	4.90	144
79	790925	12	0.37	1.34	11.0	75.0	58	92	13.0	8.0	18.0	.	.	.
80	790926	12	0.50	0.81	11.0	67.5	43	92	14.0	7.5	22.0	.	.	.
81	790927	12	0.47	0.83	11.0	69.0	46	92	15.3	9.5	21.0	.	.	.
82	790928	12	0.15	0.37	11.0	83.0	74	92	14.0	12.5	17.0	.	.	.
83	790929	12	0.48	0.89	11.0	70.5	50	91	20.0	16.0	24.0	.	.	.
84	790930	12	0.23	0.27	10.0	87.0	83	91	17.0	16.5	19.0	.	.	.
85	791001	12	0.30	1.09	11.0	59.5	29	90	15.0	14.0	16.0	.	.	.
86	791002	13	0.29	0.85	.	.	.	90	14.0	9.5	20.0	0.00	2.62	180
87	791003	13	0.56	0.90	10.0	63.5	37	90	15.0	11.5	20.0	.	.	.
88	791004	13	0.51	0.88	10.0	69.0	46	92	13.5	7.0	20.0	.	.	.
89	791005	13	0.32	0.78	10.0	74.0	56	92	8.3	4.5	12.0	.	.	.
90	791006	13	0.67	0.88	10.0	66.5	39	90	8.0	[illegible]	15.5	.	.	.
91	791007	13	0.48	1.00	10.0	64.5	37	92	10.3	6.5	14.0	.	.	.
92	791008	13/14	0.51	.	.	78.0	62	94	16.0	14.5	17.5	.	.	.
93	791009	14	0.16	0.96	8.0	84.5	72	97	0.5	-1.5	2.5	0.00	5.56	171
94	791010	14	0.50	1.00	11.0	72.0	50	94	4.0	0.5	9.0	.	.	.
95	791011	14	0.13	0.61	11.0	79.0	64	94	8.3	5.5	11.0	.	.	.
96	791012	14	0.17	0.71	11.0	64.5	35	94	8.3	4.5	12.0	.	.	.
97	791013	14	0.61	0.98	11.0	57.5	37	78	6.3	2.0	10.5	.	.	.
98	791014	14	0.52	0.87	.	62.0	30	94	5.5	-3.0	14.0	.	.	.
99	791015	15	.	.	.	.	.	93	.	.	.	0.00	6.08	166
100	791016	15	0.22	0.55	10.0	65.5	37	96	8.3	2.5	14.0	.	.	.
101	791017	15	0.36	0.87	10.0	68.0	42	94	11.0	3.5	18.5	.	.	.
102	791018	15	0.63	0.88	10.0	66.0	38	94	13.3	5.5	21.0	.	.	.
103	791019	15	0.44	0.80	10.0	69.5	45	94	13.3	5.0	21.5	.	.	.
104	791020	15	0.49	0.79	10.0	69.0	44	94	15.0	6.5	23.5	.	.	.
105	791021	15	0.52	0.79	10.0	66.0	38	94	18.3	10.0	26.5	.	.	.
106	791022	15/16	0.48	0.80	10.0	64.5	40	89	17.5	10.0	25.0	0.40	2.59	166
107	791023	16	0.19	0.93	10.0	69.0	46	92	12.8	4.5	21.0	.	.	.
108	791024	16	0.21	0.92	10.0	53.5	45	62	5.3	3.0	7.5	.	.	.

Appendix G

STA=51MF01

OBS	DATE	CHRTNO	RADMEAN	RADMAX	RADDUR	RHMEAN	RHMIN	RHMAX	TMPMEAN	TMPMIN	TMPMAX	EVAP	WINDMEAN	INTRVL
109	791025	6	0.31	0.80	10	64.0	35	73	5.0	0.5	9.5	.	.	.
110	791026	6	0.49	0.93	10	54.0	33	88	2.0	-1.5	5.5	.	.	.
111	791027	6	0.51	0.81	10	61.0	28	94	6.5	4.0	9.0	.	.	.
112	791028	6	0.16	0.34	10	75.0	55	95	5.0	0.5	9.5	.	.	.
113	791029	6/17	0.45	0.84	10	62.0	30	94	9.5	2.0	17.0	0.1	6.05	168
114	791030	7	0.39	0.71	10	67.0	38	96	6.8	-1.5	15.0	.	.	.
115	791031	7	0.41	0.70	10	70.5	46	95	6.8	1.0	12.5	.	.	.
116	791101	7	0.33	0.78	10	75.0	55	95	7.0	-0.5	16.0	.	.	.
117	791102	7	0.13	0.32	10	80.0	68	92	11.3	5.5	17.0	.	.	.
118	791103	7	0.35	0.83	10	58.0	32	86	6.3	2.0	10.5	.	.	.
119	791104	7	0.49	0.78	10	60.5	32	89	4.0	-3.0	11.0	.	.	.
120	791105	7/18	0.46	0.81	10	66.5	37	96	3.5	-4.0	11.0	0.0	5.56	.
121	791106	8	0.49	0.75	9	69.5	41	98	5.0	-3.0	13.0	.	.	.
122	791107	8	0.48	0.87	9	63.0	44	82	5.3	0.5	10.0	.	.	.
123	791108	8	0.24	0.56	9	70.5	44	97	2.8	-3.5	9.0	.	.	.
124	791109	8	0.35	0.77	10	65.5	36	95	4.3	-3.5	15.0	.	.	.
125	791110	8	0.11	0.17	9	78.0	62	94	11.6	9.5	14.0	.	.	.
126	791111	8	0.06	0.09	9	73.5	54	93	6.8	4.0	9.5	.	.	.
127	791112	8/19	.	0.50	.	70.0	62	78	3.5	3.0	4.0	-1.0	6.19	167
128	791113	9	0.05	0.14	4	77.0	65	92	4.0	4.0	5.5	.	.	.
129	791114	9	0.44	0.85	10	68.5	47	90	3.5	1.0	6.0	.	.	.
130	791115	9	0.27	0.63	10	53.5	38	69	1.3	-3.0	5.5	.	.	.
131	791116	9	0.40	0.82	9	52.0	36	68	3.5	2.5	7.0	.	.	.
132	791117	9	0.48	0.78	9	59.5	26	93	8.3	4.5	12.0	.	.	.
133	791118	9	.	0.75	.	55.5	20	91	10.3	1.5	19.0	.	.	.
134	791119	9/20	.	0.41	.	58.0	22	94	11.5	1.0	23.0	0.1	7.16	172
135	791120	20	0.38	0.67	10	63.5	31	96	10.0	0.5	19.5	.	.	.
136	791121	20	0.36	0.68	10	64.0	34	90	8.7	-0.1	17.5	.	.	.
137	791122	20	0.39	0.71	10	65.0	33	97	10.0	0.5	19.5	.	.	.
138	791123	20	0.31	0.60	10	84.0	71	97	10.0	4.0	16.0	.	.	.
139	791124	20	0.18	0.46	9	77.0	62	92	16.0	13.0	19.0	.	.	.
140	791125	20	0.25	0.59	9	75.0	54	96	15.0	9.5	20.5	.	.	.
141	791126	20/21	0.47	0.75	7	66.0	38	94	12.0	4.0	20.0	.	4.66	167
142	791127	21	0.43	0.69	10	59.5	29	90	7.5	1.0	14.0	.	.	.
143	791128	21	0.33	0.71	9	59.5	46	73	6.5	0.0	13.0	.	.	.
144	791129	21	0.42	0.81	10	45.0	36	54	-2.5	-5.5	0.5	.	.	.
145	791130	21	0.45	0.85	9	61.0	34	88	-3.8	-8.5	1.0	.	.	.
146	791201	21	0.40	0.67	9	66.0	34	98	-2.5	-8.0	3.0	.	.	.
147	791202	21	0.40	0.80	10	53.0	42	64	-4.0	-8.0	0.0	.	.	.
148	791203	21/22	0.43	0.66	9	47.0	24	78	-2.0	-8.0	4.0	.	8.41	165
149	791204	22	0.39	0.68	8	54.0	22	86	0.5	-8.0	9.0	.	.	.
150	791205	22	0.43	0.67	8	59.0	25	92	1.8	-7.5	11.0	.	.	.
151	791206	22	0.14	0.24	8	68.0	43	93	4.5	1.0	8.0	.	.	.
152	791207	22	0.45	0.66	9	54.0	30	78	4.0	0.0	9.5	.	.	.
153	791208	22	0.49	0.84	9	38.0	28	48	1.5	-4.0	7.0	.	.	.
154	791209	22	0.46	0.63	9	46.0	36	56	-0.8	-4.0	2.5	.	.	.
155	791210	22/23	0.37	0.61	8	57.0	28	86	3.0	-6.0	12.0	.	7.99	168
156	791211	23	0.39	0.65	9	60.0	26	94	7.0	-3.0	17.0	.	.	.
157	791212	23	0.40	0.64	9	65.0	41	89	11.0	4.0	10.0	.	.	.
158	791213	23	0.04	0.07	4	74.5	50	99	6.5	2.0	11.0	.	.	.
159	791214	23	0.45	0.80	8	59.0	34	84	-1.5	-6.0	3.0	.	.	.
160	791215	23	0.39	0.65	9	67.0	40	94	-3.0	-9.0	3.0	.	.	.
161	791216	23	0.16	0.45	8	73.0	49	97	2.3	-3.0	7.5	.	.	.
162	791217	23/24	0.44	0.75	9	41.0	31	51	-1.0	-8.5	6.5	.	7.07	168

Appendix G

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------------------------------------------ STA=51ME01 --------------------------------------------
OBS   DATE   CHRTNO  RADMEAN  RADMAX  RADDUR  RHMEAN  RHMIN  RHMAX  TMPMEAN  TMPMIN  TMPMAX  EVAP  WINDMEAN  INTRVL

163  791218  24       0.26     0.40     8      42.5    28     57     -6.0     -9.0    -3.0     .       .        .
164  791219  24       0.11     0.21     9      69.5    47     92     -3.8     -5.5    -2.0     .       .        .
165  791220  24       0.10     0.16     7      87.0    76     98     -4.5     -6.0    -3.0     .       .        .
166  791221  24       0.19     0.42     8      88.5    66     95     -2.5     -5.0     0.0     .       .        .
167  791222  24       0.17     0.29     8      78.0    64     92      0.0     -3.5     3.5     .       .        .
168  791223  24       0.41     0.63     8      77.5    57     98      5.8      0.5    11.0     .       .        .
169  791224  24/25    0.10     0.14     8      96.5    96     97      7.8      3.5    12.0     .      4.69     167
170  791225  25       0.27     0.65     9      88.0    40     98      7.3      2.0    12.5     .       .        .
171  791226  25       0.34     0.81     9      55.0    44     66      2.3     -0.5     5.0     .       .        .
172  791227  25       0.54     0.85     8      55.5    46     65      0.5     -2.5     3.5     .       .        .
173  791228  25       0.40     0.67     8      44.0    30     58      1.5     -2.0     5.0     .       .        .
174  791229  25       0.41     0.66     9      38.0    24     42      4.3     -3.0    11.5     .       .        .
175  791230  25        .        .       .        .       .      .       .        .       .       .       .        .
176  791231  25/26     .        .       .      66.0    36     96     -1.3     -7.5     5.0     .      9.38     168
177  800101  26       0.34     0.70     9      67.0    36     98     -2.3     -8.5     4.0     .       .        .
178  800102  26       0.46     0.64     9      61.5    48     75     -3.5     -4.0     1.0     .       .        .
179  800103  26       0.33     0.74     9      69.5    47     92     -1.0     -4.0     2.0     .       .        .
180  800104  26       0.13     0.27     9      87.0    76     98     -4.8     -6.5    -3.0     .       .        .
181  800105  26       0.13     0.17     9      79.0    60     98     -5.8     -6.0    -5.5     .       .        .
182  800106  26       0.31     0.69     9      54.0    34     84     -5.0    -10.0     0.0     .       .        .
183  800107  26/27    0.07     0.15     8      67.0    58     84     -3.3     -7.5     1.0     .      7.47     168
184  800108  27       0.38     0.76     9      60.5    38     83     -0.5     -3.0     2.0     .       .        .
185  800109  27       0.17     0.34     9      68.0    39     97     -3.8     -7.0    -0.5     .       .        .
186  800110  27       0.34     0.72    10      73.0    50     96     -5.3     -9.5    -1.0     .       .        .
187  800111  27       0.11     0.20     7      80.0    64     96      1.8     -1.5     5.0     .       .        .
188  800112  27       0.11     0.33     9      37.5    23     52      0.8     -4.5     6.0     .       .        .
189  800113  27       0.23     0.58     8      55.0    35     75     -3.8     -5.0    -2.5     .       .        .
190  800114  27/28    0.05     0.10     9      84.5    74     95     -0.3     -3.0     2.5     .      6.81     178
191  800115  28       0.28     0.64     9      74.5    59     90      3.3      1.5     5.1     .       .        .
192  800116  28       0.40     0.65     9      54.0    24     84      2.5     -1.0     6.0     .       .        .
193  800117  28       0.17     0.62     9      80.0    66     94      0.0     -3.0     3.0     .       .        .
194  800118  28       0.04     0.09     6      78.0    60     96      2.0      1.5     4.0     .       .        .
195  800119  28       0.46     0.84     9      51.0    40     62      2.0     -0.5     4.5     .       .        .
196  800120  28       0.48     0.74     9      54.5    31     78      0.0     -5.0     5.0     .       .        .
197  800121  28/29    0.47     0.75    10      54.0    21     87     -1.0     -7.0     5.0     .      7.04     167
198  800122  29       0.08     0.24     9      76.0    58     94     -1.5     -6.0     3.0     .       .        .
199  800123  29       0.28     0.72     9      57.5    32     83     -2.5     -8.0     3.0     .       .        .
200  800124  29       0.40     0.81    10      61.5    30     93     -7.3    -11.0    -3.5     .       .        .
201  800125  29       0.19     0.67     9      68.5    42     95     -1.8     -7.0     3.5     .       .        .
202  800126  29       0.41     0.77    10      51.5    35     68     -1.5     -5.5     2.5     .       .        .
203  800127  29       0.31     0.62    10      52.5    38     67     -3.5     -6.5    -0.5     .       .        .
204  800128  29/30    0.27     0.92    10      62.5    42     83     -1.5     -4.0     1.0     .      6.15     167
205  800129  30       0.38     0.75     9      52.5    38     67     -4.8     -9.0    -0.5     .       .        .
206  800130  30       0.31     0.87    10      46.5    41     52     -7.5    -10.0    -5.0     .       .        .
207  800131  30       0.47     0.86    10      63.5    35     92     -8.5    -11.0    -6.0     .       .        .
208  800201  30       0.50     0.91    10      40.0    34     46     -9.0    -11.5    -6.5     .       .        .
209  800202  30       0.49     0.85    10      39.0    32     46     -8.5    -11.0    -6.0     .       .        .
210  800203  30       0.46     0.80    10      40.0    32     48     -7.8    -11.5    -4.0     .       .        .
211  800204  30/31    0.54     0.91    11      39.0    32     46     -6.3     -9.0    -3.5     .     14.18     167
212  800205  31       0.50     0.82    10      51.5    27     76     -5.5     -9.5    -1.5     .       .        .
213  800206  31       0.12     0.22    10      69.0    48     90     -7.5    -10.0    -5.0     .       .        .
214  800207  31       0.51     0.82    10      58.0    36     80     -5.5    -10.0    -1.0     .       .        .
215  800208  31       0.48     0.82    10      40.0    26     54     -4.0     -7.5    -0.5     .       .        .
216  800209  31       0.22     0.48     9      65.0    39     91     -4.8     -6.0    -3.5     .       .        .
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Appendix G

STA=51MF01

OBS	DATE	CHRTNO	RADMEAN	RADMAX	RADDUR	RHMEAN	RHMIN	RHMAX	TMPMEAN	TMPMIN	TMPMAX	EVAP	WINDMEAN	INTRVL
217	800210	31	0.52	0.94	10	58.0	26	90	-6.3	-10.0	-2.5	.	.	.
218	800211	31/32	0.57	0.89	8	56.0	32	80	-6.3	-14.0	1.5	.	9.18	168
219	800212	32	0.53	0.84	10	47.0	26	58	-5.3	-8.5	-2.0	.	.	.
220	800213	32	0.52	0.83	10	51.5	37	76	-5.3	-11.5	1.0	.	.	.
221	800214	32	0.48	0.83	10	54.0	18	90	-1.5	-12.5	9.5	.	.	.
222	800215	32	0.34	0.82	9	63.0	46	80	0.5	-3.0	4.0	.	.	.
223	800216	32	0.36	0.98	9	62.5	32	93	-3.0	-8.0	2.0	.	.	.
224	800217	32	0.51	0.93	10	41.5	26	57	-7.8	-11.5	-4.0	.	.	.
225	800218	32/33	0.61	0.90	10	52.0	26	80	-6.0	-14.0	2.0	.	8.28	178
226	800219	33	0.56	0.91	10	52.5	19	86	-1.8	-11.5	8.0	.	.	.
227	800220	33	0.53	0.88	10	66.0	38	94	1.5	-8.5	11.5	.	.	.
228	800221	33	0.42	1.00	11	68.0	47	94	5.0	[illegible]	11.5	.	.	.
229	800222	33	0.12	0.20	10	88.0	82	94	2.5	0.5	4.5	.	.	.
230	800223	33	0.36	0.87	11	75.5	57	94	5.0	-1.0	11.0	.	.	.
231	800224	33	0.57	0.91	11	66.0	40	92	5.0	-1.0	11.0	.	.	.
232	800225	33/34	0.24	0.48	10	70.0	47	93	1.0	[illegible]	4.0	.	4.28	168
233	800226	34	0.47	1.00	10	58.5	22	95	-4.3	-7.0	-1.5	.	.	.
234	800227	34	0.28	1.00	10	42.0	32	52	-1.5	-5.0	2.0	.	.	.
235	800228	34	0.15	0.30	10	71.5	47	96	-6.5	-9.0	-4.0	.	.	.
236	800229	34	0.52	1.10	11	48.0	30	94	-11.0	-15.0	-7.0	.	.	.
237	800301	34	0.50	0.82	10	62.0	36	88	-12.8	-14.0	-11.5	.	.	.
238	800302	34	0.45	0.90	11	61.0	34	88	-10.5	-13.0	-8.0	.	.	.
239	800303	34/35	0.58	0.92	11	52.0	22	82	-7.3	-14.0	-0.5	.	11.45	168
240	800304	35	0.46	0.96	11	54.0	22	86	-4.5	-16.0	7.0	.	.	.
241	800305	35	0.42	0.98	11	75.5	57	96	4.3	-1.0	9.5	.	.	.
242	800306	35	0.61	0.95	11	48.0	28	68	2.3	-2.0	6.5	.	.	.
243	800307	35	0.37	0.80	11	69.5	42	97	8.0	-1.5	13.5	.	.	.
244	800308	35	0.39	0.74	11	67.5	51	84	14.3	10.0	18.5	.	.	.
245	800309	35	0.58	0.94	12	56.5	33	80	7.5	3.5	11.5	.	.	.
246	800310	35/36	.	.	.	64.0	30	98	3.8	-6.5	14.0	.	9.97	168
247	800311	36	.	.	.	57.5	23	92	3.3	-3.0	9.5	.	.	.
248	800312	36	.	.	.	40.0	27	53	-4.3	-6.5	-2.0	.	.	.
249	800313	36	0.07	0.15	9	70.0	44	96	-4.5	-6.0	-3.0	.	.	.
250	800314	36	0.40	1.20	11	66.0	36	96	-0.8	-3.5	2.0	.	.	.
251	800315	36	0.65	1.00	12	52.0	26	80	2.3	-3.5	8.0	.	.	.
252	800316	36	0.58	0.90	12	58.0	26	90	3.8	-5.5	13.0	.	.	.
253	800317	36/37	0.08	0.18	11	82.0	70	94	7.5	2.0	13.0	.	10.07	168
254	800318	37	0.61	1.01	11	54.0	21	87	4.8	-7.5	17.0	.	.	.
255	800319	37	0.58	0.97	11	47.0	20	74	3.0	-4.0	10.0	.	.	.
256	800320	37	0.39	0.60	11	69.5	47	92	7.0	0.0	14.0	.	.	.
257	800321	37	0.35	1.15	10	66.5	48	93	8.0	2.0	14.0	.	.	.
258	800322	37	0.48	1.10	12	46.5	38	55	0.3	-1.5	2.0	.	.	.
259	800323	37	0.62	1.01	12	56.5	25	88	4.0	-3.0	11.0	.	.	.
260	800324	37/38	0.15	0.40	10	78.0	63	93	4.0	0.0	8.0	.	11.39	168
261	800325	38	0.51	1.12	10	67.5	43	92	4.0	0.0	8.0	.	.	.
262	800326	38	0.68	1.16	12	64.0	42	86	0.8	-3.0	4.5	.	.	.
263	800327	38	0.67	1.01	12	57.0	28	86	3.5	-4.0	11.0	.	.	.
264	800328	38	0.20	0.32	12	65.5	45	86	3.3	0.0	6.5	.	.	.
265	800329	38	0.28	0.65	12	83.5	74	93	7.3	4.0	10.5	.	.	.
266	800330	38	0.30	0.71	11	75.0	57	93	8.0	4.0	12.0	.	.	.
267	800331	38/39	0.19	0.71	13	86.0	74	94	4.0	1.0	7.0	.	6.02	168
268	800401	39	0.64	1.22	12	65.5	40	91	6.0	1.0	11.0	.	.	.
269	800402	39	0.65	1.00	12	61.5	33	90	10.0	1.0	19.0	.	.	.
270	800403	39	0.65	1.00	12	66.0	40	92	10.0	4.0	16.0	.	.	.

Appendix G

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---------------------------------------------- STA=SIME01 ----------------------------------------------------------
ORS  DATE    CHRTNO  RADMEAN  RADMAX  RADDUR  RHMEAN  RHMIN  RHMAX  TMPMEAN  TMPMIN  TMPMAX  EVAP   WINDMEAN  INTRVL
271  800404  39      0.67     1.17    2       61.0    28     94     13.0     6.5     19.5    .      .         .
272  800405  39      0.76     1.20    2       79.0    24     34     7.5      3.0     12.0    .      .         .
273  800406  39      0.70     1.07    2       44.0    24     64     8.5      1.0     16.0    .      .         .
274  800407  39/40   0.46     1.16    0       62.0    32     92     7.5      0.5     14.5    0.90   8.51      171
275  800408  40      0.41     0.88    1       68.5    45     92     11.5     6.5     16.5    .      .         .
276  800409  40      0.60     1.23    2       63.0    34     92     11.5     4.0     19.0    .      .         .
277  800410  40      0.63     1.17    2       61.0    28     94     9.3      2.5     16.0    .      .         .
278  800411  40      0.73     1.11    2       56.0    22     90     11.5     5.0     18.0    .      .         .
279  800412  40      0.33     0.71    3       65.0    35     95     10.5     4.0     17.0    .      .         .
280  800413  40      0.59     1.17    2       65.0    36     94     9.8      5.5     14.0    .      .         .
281  800414  40/41   0.09     0.23    0       69.5    45     94     12.0     6.0     18.0    0.10   6.30      165
282  800415  41      0.65     1.23    2       58.5    33     68     8.0      5.0     11.0    .      .         .
283  800416  41      0.67     1.22    2       48.0    30     66     3.3      -1.0    7.5     .      .         .
284  800417  41      0.73     1.21    2       55.5    19     92     4.5      -4.0    13.0    .      .         .
285  800418  41      0.69     1.10    2       59.5    24     95     7.0      -3.0    17.0    .      .         .
286  800419  41      0.67     1.17    2       60.5    25     96     10.0     0.5     19.5    .      .         .
287  800420  41      0.61     1.13    3       56.5    19     94     14.5     3.0     26.0    .      .         .
288  800421  41/42   0.65     1.13    2       59.5    27     92     11.3     4.5     18.0    0.50   7.05      167
289  800422  42      0.69     1.12    2       47.0    22     72     12.3     4.5     20.0    .      .         .
290  800423  42      0.63     1.02    3       60.0    33     87     11.0     3.5     20.0    .      .         .
291  800424  42      0.61     1.06    3       63.0    33     93     13.3     6.0     20.5    .      .         .
292  800425  42      0.61     1.24    4       60.5    28     93     12.0     7.5     16.5    .      .         .
293  800426  42      0.08     0.16    3       70.5    47     94     6.5      5.0     8.0     .      .         .
294  800427  42      0.10     0.25    3       93.0    92     94     7.5      5.0     10.0    .      .         .
295  800428  42/43   0.11     0.25    2       89.5    86     93     8.0      7.0     9.0     -0.50  5.48      172
296  800429  43      0.65     1.20    3       63.5    33     94     11.5     6.0     17.0    .      .         .
297  800430  43      0.50     1.06    2       78.0    62     94     10.3     8.5     12.0    .      .         .
298  800501  43      0.51     1.19    3       65.5    37     94     13.0     8.0     18.0    .      .         .
299  800502  43      0.65     1.20    3       67.0    32     92     15.0     10.0    20.0    .      .         .
300  800503  43      0.66     1.13    3       62.0    30     94     14.8     8.0     21.5    .      .         .
301  800504  43      0.64     1.16    3       37.0    22     52     18.0     13.0    23.0    .      .         .
302  800505  43/44   0.88     1.14    3       41.5    23     60     18.3     9.5     27.0    0.25   7.14      169
303  800506  44      0.56     1.15    3       55.0    20     90     17.0     8.0     26.0    .      .         .
304  800507  44      0.55     1.09    4       61.0    28     94     15.0     7.0     23.0    .      .         .
305  800508  44      0.45     1.09    3       64.0    46     82     8.0      5.0     11.0    .      .         .
306  800509  44      0.77     1.32    4       61.5    30     93     9.8      -0.5    17.0    .      .         .
307  800510  44      0.66     1.15    4       61.5    25     98     8.0      -2.0    18.0    .      .         .
308  800511  44      0.36     1.09    4       65.5    40     91     15.0     10.0    20.0    .      .         .
309  800512  44/45   0.55     1.11    3       68.0    42     94     20.5     12.0    29.0    1.0    6.46      166
310  800513  45      0.82     1.21    4       88.0    38     94     21.0     13.0    27.0    .      .         .
311  800514  45      0.67     1.20    4       66.5    39     94     14.5     8.0     21.0    .      .         .
312  800515  45      0.74     1.20    4       60.5    35     86     11.0     6.0     16.0    .      .         .
313  800516  45      0.72     1.19    4       64.5    31     98     10.3     2.0     18.5    .      .         .
314  800517  45      0.91     1.22    4       67.0    36     98     11.5     4.5     17.5    .      .         .
315  800518  45      0.65     1.35    4       79.5    62     97     16.3     10.5    22.0    .      .         .
316  800519  45/46   0.36     0.98    3       73.5    51     96     17.8     12.0    23.5    0.28   5.48      163
317  800520  46      0.15     0.31    2       87.5    88     95     15.5     14.0    17.0    .      .         .
318  800521  46      0.33     1.08    4       87.5    70     95     14.5     12.0    17.0    .      .         .
319  800522  46      0.64     1.11    4       66.0    36     96     17.0     9.0     25.0    .      .         .
320  800523  46      0.51     1.29    4       74.0    52     96     18.0     11.5    24.5    .      .         .
321  800524  46      0.38     1.19    4       79.0    60     96     19.8     15.0    24.5    .      .         .
322  800525  46      0.35     0.83    4       63.5    32     95     19.3     14.5    24.0    .      .         .
323  800526  46/47   0.70     1.18    4       36.0    28     44     15.0     10.0    20.0    -0.30  3.27      169
324  800527  47      0.60     1.00    4       59.5    30     89     13.0     6.0     20.0    .      .         .
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STA=51MF01

OBS	DATE	CHRTNO	RADMEAN	RADMAX	RADDUR	RHMEAN	RHMIN	RHMAX	TMPMEAN	TMPMIN	TMPMAX	FVAP	WINDMEAN	INTRVL
325	800528	47	0.63	.10	4	65.0	32	98	15.8	7.5	24.0	.	.	.
326	800529	47	0.61	.05	4	68.5	40	97	17.5	10.0	25.0	.	.	.
327	800530	47	0.56	.07	4	75.0	52	98	17.5	11.0	24.0	.	.	.
328	800531	47	0.42	.10	5	74.5	48	97	20.5	10.0	25.0	.	.	.
329	800601	47	0.64	.17	4	69.5	43	96	21.0	14.0	28.0	.	.	.
330	800602	47/48	0.50	.15	3	73.5	51	96	21.8	17.5	26.0	1.6	4.12	168
331	800603	48	0.37	.04	3	70.5	49	92	21.5	15.5	27.5	.	.	.
332	800604	48	0.72	.27	3	53.0	38	68	14.0	12.0	20.0	.	.	.
333	800605	48	0.68	.16	3	63.0	30	96	14.5	8.0	21.0	.	.	.
334	800606	48	0.43	.08	3	77.0	58	96	13.5	8.0	19.0	.	.	.
335	800607	48	0.56	.08	5	65.5	37	94	20.5	13.0	28.0	.	.	.
336	800608	48	0.64	.24	4	63.5	34	93	17.0	10.0	24.0	.	.	.
337	800609	48/49	0.80	.22	4	55.5	26	85	11.0	3.0	19.0	1.3	7.03	170
338	800610	49	0.65	.28	5	59.0	28	98	11.3	6.0	16.5	.	.	.
339	800611	49	0.71	.16	4	60.5	29	92	9.8	2.5	17.0	.	.	.
340	800612	49	0.74	.21	4	58.5	25	97	10.3	3.0	17.5	.	.	.
341	800613	49	0.70	.14	4	59.0	26	92	11.5	2.0	21.0	.	.	.
342	800614	49	0.70	.13	4	59.5	26	93	14.8	4.5	25.0	.	.	.
343	800615	49	0.49	.09	5	66.0	40	92	20.8	13.0	28.5	.	.	.
344	800616	49/50	0.17	0.53	4	78.0	60	98	15.3	12.5	18.0	0.2	3.78	166
345	800617	50	0.71	.22	3	63.5	31	96	13.8	7.5	20.0	.	.	.
346	800618	50	0.61	.14	4	69.0	42	96	14.0	6.0	22.0	.	.	.
347	800619	50	0.73	.20	4	70.0	44	96	15.0	7.5	22.5	.	.	.
348	800620	50	0.77	.21	4	67.0	30	94	15.5	11.5	19.5	.	.	.
349	800621	50	0.73	.29	4	62.5	30	95	16.0	9.0	23.0	.	.	.
350	800622	50	0.75	.23	4	61.5	27	96	17.0	7.0	27.0	.	.	.
351	800623	50/51	0.70	.10	4	66.5	36	97	19.5	11.0	28.0	1.2	4.59	167
352	800624	51	0.48	.11	4	64.0	33	95	21.0	14.0	27.0	.	.	.
353	800625	51	0.62	.20	5	62.5	29	96	19.0	13.0	25.0	.	.	.
354	800626	51	0.55	.35	5	71.0	47	95	19.0	13.0	25.0	.	.	.
355	800627	51	0.65	.06	5	68.0	40	96	21.3	12.5	30.0	.	.	.
356	800628	51	0.57	.04	5	69.0	43	95	22.8	15.0	30.5	.	.	.
357	800629	51	0.49	.07	5	67.0	35	89	25.0	19.0	31.0	.	.	.
358	800630	51/52	0.77	.33	4	56.5	42	71	18.8	16.0	21.5	1.4	3.44	168
359	800701	52	0.74	.30	4	67.0	35	99	17.5	9.5	25.5	.	.	.
360	800702	52	0.68	.11	4	62.0	29	95	22.3	13.5	31.0	.	.	.
361	800703	52	0.28	0.83	4	81.0	68	94	20.8	18.0	23.5	.	.	.
362	800704	52	0.70	.18	5	62.5	32	93	22.5	16.5	28.5	.	.	.
363	800705	52	0.59	.22	5	70.0	44	96	23.5	17.0	30.0	.	.	.
364	800706	52	0.74	.20	4	64.5	32	97	17.0	10.0	24.0	.	.	.
365	800707	52/53	0.67	.20	3	62.5	29	96	16.8	8.0	25.5	0.9	4.20	169
366	800708	53	0.12	0.51	3	85.0	72	98	16.0	14.0	18.0	.	.	.
367	800709	53	0.62	.20	4	72.0	48	96	21.0	15.0	27.0	.	.	.
368	800710	53	0.66	.24	4	73.0	50	96	21.0	14.5	27.8	.	.	.
369	800711	53	0.62	.20	5	66.0	36	96	22.5	16.5	28.5	.	.	.
370	800712	53	0.56	.21	4	70.0	44	96	22.8	17.0	28.5	.	.	.
371	800713	53	0.72	.16	4	66.0	36	96	19.5	13.0	26.0	.	.	.
372	800714	53/54	0.61	.12	3	65.5	34	97	19.0	10.0	28.0	0.4	3.73	169
373	800715	54	0.64	.10	5	68.5	44	93	22.5	15.5	29.5	.	.	.
374	800716	54	0.61	.05	4	66.5	38	95	26.0	18.0	34.0	.	.	.
375	800717	54	0.56	.15	4	68.0	42	94	25.5	18.0	33.0	.	.	.
376	800718	54	0.71	.16	4	65.5	40	95	22.5	16.5	28.5	.	.	.
377	800719	54	0.60	.09	4	68.0	40	96	21.8	16.5	31.0	.	.	.
378	800720	54	0.60	.05	5	64.0	33	95	26.5	18.5	34.5	.	.	.

Appendix G

STA=SIMF01

OBS	DATE	CHRTNO	RADMEAN	RADMAX	RADDUR	RHMEAN	RHMIN	RHMAX	TMPMEAN	TMPMIN	TMPMAX	EVAP	WINDMEAN	INTRVL
379	800721	54/55	0.59	1.10	4	65.0	35	95	26.0	18.5	33.5	1.2	3.09	167
380	800722	55	0.54	1.15	4	69.0	44	94	23.5	17.0	30.0	.	.	.
381	800723	55	0.33	0.87	4	78.0	62	94	19.8	16.0	23.5	.	.	.
382	800724	55	0.76	1.20	4	64.5	34	95	[illegible]	14.0	25.0	.	.	.
383	800725	55	0.69	1.10	4	68.5	41	96	19.3	11.5	27.0	.	.	.
384	800726	55	0.66	1.10	4	65.0	36	94	22.5	16.0	29.0	.	.	.
385	800727	55	0.72	1.22	4	63.5	33	96	20.5	14.5	26.5	.	.	.
386	800728	55/56	0.45	1.31	3	77.0	48	96	21.5	17.5	25.5	0.4	3.37	168
387	800729	56	0.70	1.17	3	71.0	46	96	22.3	18.0	26.5	.	.	.
388	800730	56	0.56	1.14	3	66.0	36	96	22.3	16.0	28.5	.	.	.
389	800731	56	0.57	1.00	4	67.0	38	96	22.8	15.5	30.0	.	.	.
390	800801	56	0.50	1.06	4	65.5	35	96	24.5	17.0	32.0	.	.	.
391	800802	56	0.59	1.12	4	67.5	39	96	23.8	15.5	32.0	.	.	.
392	800803	56	0.53	1.09	4	69.5	42	97	25.0	19.0	31.0	.	.	.
393	800804	56/57	0.44	1.07	2	69.5	43	97	24.0	17.0	31.0	1.1	4.12	168
394	800805	57	0.48	1.06	3	67.5	39	96	[illegible]	18.0	31.0	.	.	.
395	800806	57	0.53	1.21	3	71.0	45	96	22.8	17.0	28.5	.	.	.
396	800807	57	0.60	1.10	3	64.0	32	96	24.0	17.0	31.0	.	.	.
397	800808	57	0.68	1.06	3	65.0	34	96	24.0	15.0	33.0	.	.	.
398	800809	57	0.59	1.08	3	68.5	43	98	[illegible]	[illegible]	[illegible]	.	.	.
399	800810	57	0.54	1.00	3	68.5	42	95	24.3	18.5	30.0	.	.	.
400	800811	57/58	0.55	1.20	4	70.0	44	96	24.8	17.5	32.0	0.9	2.66	168
401	800812	58	0.49	1.08	3	69.5	43	96	22.0	16.5	27.5	.	.	.
402	800813	58	0.64	1.20	[illegible]	68.5	41	98	[illegible]	[illegible]	[illegible]	.	.	.
403	800814	58	0.64	1.17	4	62.5	29	96	21.5	13.0	30.0	.	.	.
404	800815	58	0.26	0.62	3	78.5	61	96	21.3	18.0	24.5	.	.	.
405	800816	58	0.68	1.14	4	61.5	33	98	16.3	11.0	21.5	.	.	.
406	800817	58	[illegible]	1.21	[illegible]	68.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	.	.
407	800818	58/59	0.29	0.59	2	84.5	72	97	16.0	12.5	19.5	-1.1	3.86	169
408	800819	59	0.30	1.01	3	74.5	53	97	20.8	15.5	26.0	.	.	.
409	800820	59	0.35	1.00	3	71.5	50	97	20.5	16.5	24.5	.	.	.
410	800821	59	0.17	0.38	3	81.5	68	[illegible]	[illegible]	[illegible]	[illegible]	.	.	.
411	800822	59	0.48	0.91	3	74.0	51	97	17.0	12.0	27.0	.	.	.
412	800823	59	0.54	1.12	2	70.0	44	96	19.8	15.0	24.5	.	.	.
413	800824	59	0.63	1.11	2	65.5	35	96	21.3	15.0	27.5	.	.	.
414	800825	59/60	0.68	1.18	[illegible]	68.5	27	98	[illegible]	[illegible]	[illegible]	0.7	1.83	165
415	800826	60	0.61	1.11	3	61.5	26	97	20.8	11.5	30.0	.	.	.
416	800827	60	0.65	1.00	3	62.5	29	96	21.8	12.0	31.5	.	.	.
417	800828	60	0.62	0.98	3	64.5	33	96	22.5	14.5	30.5	.	.	.
418	800829	60	0.48	0.95	4	65.0	34	98	[illegible]	15.0	31.5	.	.	.
419	800830	60	0.65	1.07	3	65.5	36	97	23.0	15.0	31.0	.	.	.
420	800831	60	0.48	1.10	3	65.5	37	94	24.0	18.0	30.0	.	.	.
421	800901	60/61	0.62	1.01	3	63.0	29	97	24.0	15.0	33.0	1.6	2.60	170
422	800902	61	0.63	1.01	3	61.5	28	[illegible]	[illegible]	[illegible]	[illegible]	.	.	.
423	800903	61	0.58	1.11	3	64.0	33	95	20.8	14.0	27.5	.	.	.
424	800904	61	0.52	0.96	3	67.0	38	96	20.5	12.5	28.5	.	.	.
425	800905	61	0.54	0.97	2	65.0	35	95	23.8	17.0	30.5	.	.	.
426	800906	61	0.60	1.03	[illegible]	64.0	32	96	[illegible]	[illegible]	[illegible]	.	.	.
427	800907	61	0.63	1.07	3	58.0	24	92	18.5	11.5	25.5	.	.	.
428	800908	61/62	0.67	1.00	2	59.5	26	93	19.5	12.0	27.0	1.6	3.59	166
429	800909	62	0.61	1.00	2	64.0	30	98	18.5	9.0	28.0	.	.	.
430	800910	62	0.69	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	.	.
431	800911	62	0.63	1.02	3	59.0	20	98	14.5	4.5	24.5	.	.	.
432	800912	62	0.61	0.98	2	59.5	21	98	17.8	6.5	29.0	.	.	.

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OBS	DATE	CHRTNO	RADMEAN	RADMAX	RADDUR	RHMEAN	RHMIN	RHMAX	TMPMEAN	TMPMIN	TMPMAX	EVAP	WINDMEAN	INTRVL
433	800913	62	0.64	0.99	12	62.0	27	97	19.3	9.0	29.5	.	.	.
434	800914	62	0.54	0.97	12	63.5	31	96	20.5	11.0	30.0	.	.	.
435	800915	62/63	0.60	1.11	12	65.5	36	95	19.0	12.5	25.5	1.8	3.95	168
436	800916	63	0.39	0.85	12	70.5	44	97	14.5	8.0	21.0	.	.	.
437	800917	63	0.46	0.96	12	71.5	45	98	21.5	16.0	27.0	.	.	.
438	800918	63	0.53	1.00	12	68.5	41	96	18.8	13.5	24.0	.	.	.
439	800919	63	0.58	0.94	12	67.0	37	97	18.3	11.5	25.0	.	.	.
440	800920	63	0.50	1.02	12	71.0	45	97	18.5	11.0	26.0	.	.	.
441	800921	63	0.49	0.93	12	70.5	44	97	23.0	16.5	29.5	.	.	.
442	800922	63/64	0.58	0.91	11	67.0	38	96	23.0	16.0	30.0	0.4	4.51	168
443	800923	64	0.41	0.82	11	71.5	50	93	20.3	15.5	25.0	.	.	.
444	800924	64	0.31	0.40	11	63.5	36	91	16.5	15.0	18.0	.	.	.
445	800925	64	0.17	0.41	11	93.0	88	98	15.3	13.0	17.5	.	.	.
446	800926	64	0.63	0.98	11	61.0	26	96	13.5	9.0	18.0	.	.	.
447	800927	64	0.63	1.06	11	63.5	30	97	9.0	1.5	16.5	.	.	.
448	800928	64	0.60	1.07	11	62.0	26	98	11.0	1.5	20.5	.	.	.
449	800929	64/65	0.55	0.90	11	65.0	32	98	12.0	3.5	20.5	0.1	4.62	168
450	800930	65	0.31	0.71	11	76.5	55	98	12.8	6.5	19.0	.	.	.
451	801001	65	0.44	0.93	12	72.5	48	97	16.5	11.0	22.0	.	.	.
452	801002	65	0.56	1.01	12	71.0	44	98	17.5	10.5	24.5	.	.	.
453	801003	65	0.14	0.41	12	83.0	68	98	10.3	7.5	13.0	.	.	.
454	801004	65	0.60	1.07	11	65.5	33	98	10.0	6.5	13.5	.	.	.
455	801005	65	0.56	1.02	11	57.0	36	78	9.3	5.5	13.0	.	.	.
456	801006	65/66	0.55	0.89	11	.	.	.	.	.	.	0.2	4.49	168
457	801007	66	0.54	0.84	11	.	.	.	.	.	.	.	.	.
458	801008	66	0.58	0.86	11	.	.	.	.	.	.	.	.	.
459	801009	66	0.55	0.92	11	67.5	37	98	22.5	13.0	32.0	.	.	.
460	801010	66	0.17	0.30	11	69.5	41	98	18.0	14.0	19.5	.	.	.
461	801011	66	0.54	0.87	11	57.5	17	98	21.8	14.0	29.5	.	.	.
462	801012	66	0.55	1.07	12	44.5	33	56	16.8	13.0	20.5	.	.	.
463	801013	66/67	0.64	0.99	10	53.5	30	77	12.5	6.5	18.5	0.9	5.29	169
464	801014	67	0.54	0.88	10	63.0	29	97	13.0	5.5	20.5	.	.	.
465	801015	67	0.58	0.87	10	58.5	21	96	19.3	9.5	29.0	.	.	.
466	801016	67	0.47	0.76	10	59.5	21	98	17.8	8.5	27.0	.	.	.
467	801017	67	0.53	0.90	11	67.0	36	98	16.0	6.0	26.0	.	.	.
468	801018	67	0.31	0.80	[illegible]	76.0	54	98	20.0	19.5	28.0	.	.	.
469	801019	67	0.50	0.93	10	.	.	.	.	.	.	.	.	.
470	801020	67/68	0.45	1.05	11	.	.	.	.	.	.	0.7	5.46	168
471	801021	68	0.53	0.83	10	.	.	.	.	.	.	.	.	.
472	801022	68	0.50	0.74	10	63.5	24	98	11.5	4.0	19.0	.	.	.
473	801023	68	0.45	0.79	11	67.0	36	98	6.3	0.5	17.0	.	.	.
474	801024	68	0.54	0.88	11	70.0	42	98	7.0	-0.5	14.5	.	.	.
475	801025	68	0.20	0.65	9	67.5	37	98	9.8	6.0	13.5	.	.	.
476	801026	68	0.52	0.90	11	43.0	32	54	6.0	3.0	10.5	.	.	.
477	801027	68/69	0.45	0.80	10	65.0	37	93	5.3	-1.0	11.5	-1.1	6.88	167
478	801028	69	0.32	0.77	9	76.5	57	96	12.8	7.0	18.5	.	.	.
479	801029	69	0.49	0.90	11	67.0	36	98	6.5	2.5	10.5	.	.	.
480	801030	69	0.48	0.80	10	69.5	33	98	6.3	0.0	12.5	.	.	.
481	801031	69	0.48	0.79	10	58.5	19	98	7.0	-4.0	18.0	.	.	.
482	801101	69	0.49	0.80	10	48.5	23	74	10.5	3.0	18.0	.	.	.
483	801102	69	0.54	0.93	10	71.0	43	99	4.0	-2.0	10.0	.	.	.
484	801103	69/70	0.32	0.77	10	88.0	33	99	4.0	-4.5	14.5	0.9	5.29	168
485	801104	70	0.11	0.21	10	79.5	61	98	9.5	7.5	11.5	.	.	.
486	801105	70	0.39	0.97	10	59.5	31	86	7.5	3.0	12.0	.	.	.

Appendix G

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------------------------------------------------- STA=SIMF01 -------------------------------------------------------
OBS   DATE    CHRTNO  RADMEAN  RADMAX  RADDUR  RHMEAN  RHMIN  RHMAX  TMPMEAN  TMPMIN  TMPMAX  EVAP  WINDMEAN  INTRVL
487  801106   70       0.52     0.77    10      64.0    29     99     4.0     -3.5    13.0     .       .         .
488  801107   70       0.40     0.81    10      58.0    31     85    12.0      3.5    20.5     .       .         .
489  801108   70       0.44     0.80    10      72.5    46     99    13.8      6.0    21.5     .       .         .
490  801109   70       0.36     0.87    10      65.5    32     99  [illegible]  4.0    21.0     .       .         .
491  801110   70/71    0.48     0.79    10      39.5    32     47     9.3      2.0    16.5    8.5    7.76      170
492  801111   71       0.52     0.81    10      42.5    36     49     4.3      1.5     7.0     .       .         .
493  801112   71       0.44     0.77    10      41.5    38     53     5.5      0.5    10.5     .       .         .
494  801113   71       0.51     0.72    10      58.0    23     81     7.5     -1.0    16.0     .       .         .
495  801114   71       0.29     0.63    10      60.5    28     93    12.5      6.5    18.5     .       .         .
496  801115   71       0.13     0.29     9      77.5    56     99     8.0      4.5    11.5     .       .         .
497  801116   71       0.52     0.86    10        .      .      .      .        .       .       .       .         .
498  801117   71/72    0.09     0.20     8        .      .      .      .        .       .      8.8   10.38   [illegible]
499  801118   72       0.52     0.87     9      77.0    57     97     1.8     -0.5     4.0     .       .         .
500  801119   72       0.55     0.81     9      69.5    42     97     0.3     -5.5     6.0     .       .         .
501  801120   72       0.43     0.70     9      64.0    30     98     0.5     -7.5     8.5     .       .         .
502  801121   72       0.44     0.61     9      68.0    26     98     2.5     -4.5    11.5     .       .         .
503  801122   72       0.50     0.72     9      63.5    32     95     2.8     -4.5    10.0     .       .         .
504  801123   72       0.17     0.36     9      64.5    35     97     2.8     -5.5     9.5     .       .         .
505  801124   72/73    0.04     0.08     9      74.5    51     98     4.5      3.0     6.0   -1.2    6.38      168
506  801125   73       0.40     0.70     9      61.5    30     87     4.8      1.0     8.5     .       .         .
507  801126   73       0.43     0.70     9      64.5    33     96     2.3     -1.5     6.0     .       .         .
508  801127   73       0.26     0.82     8      78.0    58     98     1.8     -1.5     5.0     .       .         .
509  801128   73       0.08     0.19     9      73.5    49     98     2.8      0.0     5.5     .       .         .
510  801129   73       0.17     0.34     9      65.0    44     86     3.3      0.0     6.5     .       .         .
511  801130   73       0.46     0.67     9      49.5    30     69     7.0      1.5    12.5     .       .         .
512  801201   73/74    0.42     0.68     9      56.0    32     80    11.8      4.5    19.0   -8.7    7.61      170
513  801202   74       0.44     0.85    10      63.5    31     96    11.0      4.5    17.5     .       .         .
514  801203   74       0.49     0.76    10      41.0    37     45     1.3     -1.5     4.0     .       .         .
515  801204   74       0.44     0.73    10      57.5    26     89    -0.3     -5.5     5.0     .       .         .
516  801205   74       0.23     0.55     8      52.5    33     72     1.3     -2.5     5.0     .       .         .
517  801206   74       0.28     0.60     9      63.0    36     90     6.8      2.5    11.0     .       .         .
518  801207   74       0.28     0.84     9      71.5    45     98    10.8      5.5    16.0     .       .         .
519  801208   74/75    0.35     0.69     9      69.5    41     98    13.0      4.0    22.0     .     7.62      168
520  801209   75       0.05     0.09     8      77.0    46     98    14.3     10.0    18.5     .       .         .
521  801210   75       0.12     0.25     9      61.5    47     76     5.5      1.0    10.0     .       .         .
522  801211   75       0.21     0.50     9      74.5    51     98     0.8     -1.0     2.5     .       .         .
523  801212   75       0.41     0.80     9      71.5    45     98     1.8     -3.5     7.0     .       .         .
524  801213   75       0.23     0.50    10      54.0    41     67     6.0     -0.5    12.5     .       .         .
525  801214   75       0.44     0.71     9      60.0    28     92     3.0     -4.5    10.5     .       .         .
526  801215   75/76    0.17     0.37     9      74.5    51     98    -2.0     -5.5     0.0     .     8.80      168
527  801216   76       0.13     0.30     8      79.5    63     96     0.8     -1.5     3.0     .       .         .
528  801217   76       0.35     0.63     9      64.5    31     98    -3.8     -8.5     1.0     .       .         .
529  801218   76       0.33     0.60     9      61.0    33     89     1.0     -7.5     9.5     .       .         .
530  801219   76       0.38     0.77     9      56.0    38     84    -0.8     -8.0     6.5     .       .         .
531  801220   76       0.42     0.62     9      43.5    31     58    -9.5    -11.5    -7.5     .       .         .
532  801221   76       0.37     0.60     9      47.0    29     65    -8.3    -12.5    -4.0     .       .         .
533  801222   76/77    0.27     0.51    10      63.0    36     98    -7.5    -13.5    -1.5     .     7.45      168
534  801223   77       0.39     0.66     8      76.0    56     98    -1.3     -4.5     2.0     .       .         .
535  801224   77         .        .      .        .      .      .      .        .       .       .     2.61       48
536  810101             .        .      .        .      .      .      .        .       .       .       .         .
537  810102             .        .      .        .      .      .      .        .       .       .       .         .
538  810103             .        .      .        .      .      .      .        .       .       .       .         .
539  810104             .        .      .        .      .      .      .        .       .       .       .         .
540  810105             .        .      .        .      .      .      .        .       .       .       .         .
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Appendix G

STA=51MF01

OBS	DATE	CHRTNO	RADMEAN	RADMAX	RADDUR	RHMEAN	RHMIN	RHMAX	THPMEAN	TMPMIN	TMPMAX	EVAP	WINDMEAN	INTRVL
541	810106	78	0.27	0.63	9	68.0	40	96	-5.0	-12.5	2.5	.	.	.
542	810107	78	0.35	0.74	9	66.0	34	98	-3.0	-9.0	3.0	.	.	.
543	810108	78	0.39	0.74	9	62.0	37	87	-9.5	-14.0	-5.0	.	.	.
544	810109	78	0.25	0.68	9	68.0	39	97	-8.3	-14.0	-3.5	.	.	.
545	810110	78	0.51	0.82	9	58.0	32	84	-7.8	-10.0	-5.5	.	.	.
546	810111	78	0.45	0.82	9	45.5	34	57	-8.3	-11.5	-5.0	.	.	.
547	810112	78/79	0.43	0.70	8	53.0	40	66	-10.5	-14.0	-7.0	.	7.78	164
548	810113	79	0.26	0.45	9	66.0	46	86	-10.0	-15.0	-5.0	.	.	.
549	810114	79	0.17	0.34	8	74.5	54	95	-4.3	-8.5	0.0	.	.	.
550	810115	79	0.24	0.41	8	85.5	73	98	-3.5	-7.5	0.5	.	.	.
551	810116	79	0.25	0.67	9	67.0	36	98	-0.8	-5.0	3.5	.	.	.
552	810117	79	0.43	0.72	10	42.5	33	52	-4.8	-7.0	-2.5	.	.	.
553	810118	79	0.46	0.70	10	52.5	35	70	-3.3	-10.0	3.5	.	.	.
554	810119	79/80	0.45	0.80	9	42.0	24	60	4.8	-2.5	12.0	.	.	.
555	810120	80	.	0.78	.	66.0	42	90	7.0	3.0	11.0	.	7.73	192
556	810121	80	0.07	0.14	8	90.5	83	98	-0.8	-4.5	3.0	.	.	.
557	810122	80	0.44	0.66	10	66.5	35	98	3.3	-4.5	11.0	.	.	.
558	810123	80	0.33	0.83	10	52.5	43	62	3.8	2.0	5.5	.	.	.
559	810124	80	0.43	0.79	10	66.0	42	98	0.3	-5.0	5.5	.	.	.
560	810125	80	0.48	0.72	10	67.0	36	98	0.8	-7.0	8.5	.	.	.
561	810126	80/81	0.16	0.46	9	65.0	40	90	5.8	-1.5	13.0	.	6.87	164
562	810127	81	0.14	0.27	9	69.5	41	98	5.0	-1.0	11.0	.	.	.
563	810128	81	0.51	0.86	9	48.5	27	70	3.3	-3.0	8.5	.	.	.
564	810129	81	0.55	0.78	10	46.5	33	68	0.3	-3.5	4.0	.	.	.
565	810130	81	0.52	0.76	10	54.0	39	69	-4.5	-7.5	-1.5	.	.	.
566	810131	81	0.51	0.79	10	51.0	24	78	-3.8	-10.0	2.5	.	.	.
567	810201	81	0.27	0.62	10	66.0	36	96	-3.5	-11.0	4.0	.	.	.
568	810202	81/82	0.33	0.87	9	66.5	34	99	4.0	-4.0	12.0	.	7.60	168
569	810203	82	0.53	0.80	10	38.0	28	48	-6.8	-9.5	-4.0	.	.	.
570	810204	82	0.49	0.80	9	49.0	26	72	-6.0	-11.5	-0.5	.	.	.
571	810205	82	0.51	0.81	9	52.0	27	77	-6.0	-10.5	-1.5	.	.	.
572	810206	82	0.50	0.77	8	58.5	28	89	-0.8	-8.0	6.5	.	.	.
573	810207	82	0.37	0.73	9	67.0	36	98	-1.3	-8.0	5.5	.	.	.
574	810208	82	0.14	0.47	9	67.0	36	98	0.8	-4.0	4.0	.	.	.
575	810209	82/83	0.51	0.81	9	58.0	30	86	-2.5	-7.0	2.0	.	8.55	169
576	810210	83	0.12	0.24	7	74.5	52	97	1.5	-7.5	10.5	.	.	.
577	810211	83	0.14	0.20	9	70.0	42	98	4.3	-6.0	14.5	.	.	.
578	810212	83	0.54	0.81	10	56.0	34	78	-9.0	-12.0	-6.0	.	.	.
579	810213	83	0.51	0.76	10	60.0	28	92	-4.5	-11.0	2.0	.	.	.
580	810214	83	0.60	0.82	10	61.0	26	96	0.3	-8.0	8.5	.	.	.
581	810215	83	0.60	0.81	11	60.0	24	96	1.0	-8.0	10.0	.	.	.
582	810216	83	0.56	0.92	11	66.0	36	96	4.5	-5.0	14.0	.	.	.
583	810217	83/84	.	.	.	74.0	52	96	10.0	4.0	16.0	.	6.42	190
584	810218	84	0.56	0.82	10	70.0	43	97	11.3	2.0	20.5	.	.	.
585	810219	84	0.24	0.70	10	85.5	73	98	10.3	5.0	15.5	.	.	.
586	810220	84	0.10	0.20	9	80.0	62	98	9.8	7.0	12.5	.	.	.
587	810221	84	0.35	0.90	10	78.5	60	97	9.3	6.5	12.0	.	.	.
588	810222	84	0.10	0.26	9	94.0	91	97	11.3	9.5	13.0	.	.	.
589	810223	84	0.09	0.23	9	80.5	64	97	7.8	1.5	14.0	.	.	.
590	810224	84/85	0.41	0.88	10	.	.	.	.	.	.	.	7.98	178
591	810225	85	0.56	0.98	10	51.5	35	68	4.8	2.0	7.5	.	.	.
592	810226	85	0.57	0.88	11	57.0	43	61	9.3	7.0	8.5	.	.	.
593	810227	85	0.59	0.92	11	56.0	23	89	5.8	-1.5	13.0	.	.	.
594	810228	85	0.42	0.74	10	60.5	28	93	6.8	-1.0	14.5	.	.	.

Appendix G

STA=51ME01

OBS	DATE	CHRTNO	RADMEAN	RADMAX	RADDUR	RHMEAN	RHMIN	RHMAX	TMPMEAN	TMPMIN	TMPMAX	EVAP	WINDMEAN	INTRVL
595	810301	85	0.59	0.89	10	74.5	51	98	6.0	0.5	13.0	.	.	.
596	810302	85/86	.	.	.	70.0	42	98	3.3	-1.0	7.5	.	10.87	168
597	810303	86	.	.	.	59.0	29	89	-1.0	-6.0	4.0	.	.	.
598	810304	86	.	.	.	87.5	37	98	[illegible]	[illegible]	6.0	.	.	.
599	810305	86	0.08	0.14	11	91.0	84	98	1.3	1.0	1.5	.	.	.
600	810306	86	0.58	1.01	11	63.0	34	97	2.5	0.5	4.5	.	.	.
601	810307	86	0.62	1.00	12	51.0	40	62	1.0	-2.0	4.0	.	.	.
602	810308	86	0.33	0.74	11	61.5	31	78	1.3	-1.5	6.0	.	.	.
603	810309	86/87	0.41	0.78	11	55.5	38	73	4.8	2.5	7.0	.	12.28	167
604	810310	87	.	.	.	64.5	37	92	4.3	0.0	8.5	.	.	.
605	810311	87	.	.	.	65.0	33	97	3.8	-2.0	9.5	.	.	.
606	810312	87	.	.	.	50.5	27	74	5.3	-0.5	11.0	.	.	.
607	810313	87	0.59	1.05	11	47.0	22	62	10.0	1.5	18.5	.	.	.
608	810314	87	0.66	1.01	11	.	.	.	.	.	.	.	.	.
609	810315	87	0.63	1.08	11	.	.	.	.	.	.	.	.	.
610	810316	87/88	0.15	0.25	11	.	.	.	.	.	.	.	11.90	167
611	810317	88	0.66	1.05	11	47.5	32	63	0.5	-6.5	7.5	.	.	.
612	810318	88	0.20	0.42	11	65.5	41	90	-3.0	-6.0	-1.5	.	.	.
613	810319	88	0.57	1.20	12	68.5	39	98	-2.0	-6.5	2.5	.	.	.
614	810320	88	0.08	1.10	12	81.0	38	98	-0.3	-6.5	5.5	.	.	.
615	810321	88	0.52	1.02	12	62.5	28	97	2.3	-2.0	6.5	.	.	.
616	810322	88	0.57	1.05	12	65.0	36	94	1.5	-6.0	9.0	.	.	.
617	810323	88/89	0.40	0.66	11	64.5	32	97	2.8	-3.0	8.5	.	10.80	168
618	810324	89	0.00	1.00	11	99.0	20	84	5.3	-1.5	17.0	.	.	.
619	810325	89	0.58	1.09	12	63.5	30	97	3.0	-3.5	11.0	.	.	.
620	810326	89	0.65	1.03	12	60.0	23	97	5.5	-5.0	16.0	.	.	.
621	810327	89	0.43	0.91	12	59.0	34	84	10.5	5.0	15.0	.	.	.
622	810328	89	0.09	1.01	12	97.0	79	89	9.0	1.0	17.0	.	.	.
623	810329	89	0.58	1.00	12	45.0	30	68	15.0	6.0	24.0	.	.	.
624	810330	89/90	0.13	0.63	11	77.5	57	98	14.5	12.0	17.0	1.8	10.47	171
625	810331	90	.	1.04	.	61.0	24	98	18.0	10.0	26.0	.	.	.
626	810401	90	0.21	0.49	12	74.0	50	98	13.5	7.5	19.5	.	.	.
627	810402	90	0.70	1.08	12	39.0	20	58	14.5	8.0	21.0	.	.	.
628	810403	90	0.62	1.10	12	54.0	18	90	15.0	2.5	27.5	.	.	.
629	810404	90	0.64	1.30	12	59.5	44	75	20.3	15.5	25.0	.	.	.
630	810405	90	0.17	0.43	11	71.5	44	99	16.0	11.0	21.0	.	.	.
631	810406	90/91	0.69	1.20	12	45.5	34	57	7.8	6.5	9.0	0.6	11.48	167
632	810407	91	0.71	1.08	12	53.0	22	84	12.0	8.0	16.0	.	.	.
633	810408	91	0.61	1.04	12	57.0	26	88	12.5	1.5	23.5	.	.	.
634	810409	91	0.19	0.88	11	77.0	68	98	13.3	10.0	17.0	.	.	.
635	810410	91	0.74	1.20	12	47.0	24	70	12.5	6.0	19.0	.	.	.
636	810411	91	0.23	0.48	11	78.0	58	98	14.8	9.5	23.0	.	.	.
637	810412	91	0.41	1.09	13	77.5	57	98	14.5	6.0	23.0	.	.	.
638	810413	91/92	0.33	0.73	12	77.0	48	98	7.8	4.0	10.5	-2.1	8.90	168
639	810414	92	0.43	1.01	10	68.0	38	98	12.8	6.5	19.0	.	.	.
640	810415	92	0.69	1.04	13	61.5	26	97	6.8	0.5	13.0	.	.	.
641	810416	92	0.65	1.10	13	65.5	33	99	8.3	-2.5	19.0	.	.	.
642	810417	92	0.25	0.72	13	73.5	40	97	14.3	11.0	17.5	.	.	.
643	810418	92	0.65	1.18	13	57.0	17	97	18.8	12.5	25.0	.	.	.
644	810419	92	0.68	1.11	12	67.5	30	95	12.5	7.0	18.0	.	.	.
645	810420	92/93	0.61	1.30	13	61.5	26	97	9.5	4.0	15.0	-0.3	9.72	167
646	810421	93	0.77	1.17	12	61.0	24	98	4.3	-0.5	11.0	.	.	.
647	810422	93	0.49	1.00	13	67.0	36	98	8.8	-0.5	18.0	.	.	.
648	810423	93	0.37	1.20	13	70.0	42	98	17.3	9.5	25.0	.	.	.

Appendix G

------------------------------ STA=51MF01 ------------------------------

OBS	DATE	CHRTNO	RADMEAN	RADMAX	RADDUR	RHMEAN	RHMIN	RHMAX	TMPMEAN	TMPMIN	TMPMAX	EVAP	WINDMEAN	INTRVL
649	810424	93	0.46	1.20	3	63.0	29	97	13.3	7.5	19.0	.	.	.
650	810425	93	0.53	1.20	3	67.0	47	87	6.8	2.5	11.0	.	.	.
651	810426	93	0.70	1.15	3	65.0	32	98	10.3	2.0	18.5	.	.	.
652	810427	93/94	0.83	1.10	4	68.5	39	99	16.0	10.0	22.0	1.2	8.63	168
653	810428	94	0.58	1.02	3	70.5	44	97	18.5	9.0	28.0	.	.	.
654	810429	94	0.35	0.78	3	84.5	72	97	19.5	13.0	26.0	.	.	.
655	810430	94	0.36	1.10	3	75.5	53	98	14.0	11.0	17.0	.	.	.
656	810501	94	0.13	0.45	3	94.0	90	99	10.9	9.0	12.0	.	.	.
657	810502	94	0.56	1.28	4	49.5	28	71	12.0	8.0	16.0	.	.	.
658	810503	94	0.76	1.06	3	62.0	27	97	11.0	3.0	19.0	.	.	.
659	810504	94/95	0.65	1.02	3	62.0	26	98	13.8	3.5	24.0	-0.2	6.55	178
660	810505	95	0.98	1.18	3	88.5	36	97	14.5	4.5	23.5	.	.	.
661	810506	95	0.19	0.73	2	78.0	59	97	13.8	9.5	18.0	.	.	.
662	810507	95	0.72	1.19	4	60.5	24	97	9.5	3.0	16.0	.	.	.
663	810508	95	0.74	1.15	3	61.5	26	97	9.5	1.0	18.0	.	.	.
664	810509	95	0.84	1.30	4	73.0	48	98	18.5	8.5	28.5	.	.	.
665	810510	95	0.18	0.52	3	93.0	89	97	14.8	12.5	17.0	.	.	.
666	810511	95/96	0.27	0.73	4	98.0	83	97	17.3	15.0	19.5	0.7	4.98	168
667	810512	96	0.62	1.31	3	74.0	50	98	13.3	8.5	18.0	.	.	.
668	810513	96	0.73	1.18	3	88.5	30	97	12.0	4.0	21.5	.	.	.
669	810514	96	0.64	1.09	4	69.5	41	98	18.5	11.0	26.0	.	.	.
670	810515	96	0.38	1.17	4	79.0	60	98	17.0	13.0	21.0	.	.	.
671	810516	96	0.66	1.30	3	73.5	54	93	13.8	10.0	17.5	.	.	.
672	810517	96	0.71	1.20	3	88.5	38	99	14.9	8.5	22.5	.	.	.
673	810518	96/97	0.15	0.38	3	75.5	53	98	11.0	8.5	13.5	0.5	6.87	178
674	810519	97	0.15	0.36	3	87.5	77	98	9.5	9.0	10.0	.	.	.
675	810520	97	0.69	1.25	4	64.5	31	98	12.8	5.5	20.0	.	.	.
676	810521	97/98	0.71	1.13	3	90.5	83	98	13.5	3.5	22.5	-0.2	3.13	78
677	810522	98	0.64	1.08	3	30.5	22	39	22.5	18.5	26.5	.	.	.
678	810523	98	0.66	1.17	3	63.5	32	95	16.8	8.5	25.0	.	.	.
679	810524	98	0.63	1.05	4	61.5	26	97	19.3	11.0	27.5	.	.	.
680	810525	98	0.84	1.04	4	88.0	35	97	21.0	12.0	30.0	.	.	.
681	810526	98	0.51	1.00	4	72.0	46	98	20.8	14.0	27.5	.	.	.
682	810527	98	0.53	1.10	5	73.0	50	96	21.8	17.5	26.0	.	.	.
683	810528	98/99	0.51	1.21	1	82.5	66	99	21.3	17.5	25.0	1.4	5.22	168
684	810529	99	0.69	1.35	4	77.5	57	98	21.0	17.5	26.0	.	.	.
685	810530	99	0.67	1.28	5	70.5	43	98	21.3	14.0	28.5	.	.	.
686	810531	99	0.41	1.20	4	74.0	50	98	19.3	14.5	24.0	0.0	3.86	95

APPENDIX H

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                        WATER QUALITY DATA COLLECTED AT OCCOQUAN STREAM STATIONS
                                  DURING THE PERIOD MAY 1979-MAY 1981
-------------------------------------------------- STA=51ST05 -------------------------------------------------

OBS  STRMNO       TI1            TI2        STG     FLO  TKN   SKN   NH3   NO23  TP    TSP   OP       TSS    COD

  1       .  20MAY79:03:15  20MAY79:17:00  1.41    4.70  1.38  1.10  0.19  0.14  0.15  0.15  0.05   124.0   47.0
  2       .  28JUL79:17:45  28JUL79:19:00  1.53    8.90  3.36  1.02  0.41  0.51  0.42  0.06  0.04   257.0   85.7
  3       .  29JUL79:17:40  30JUL79:06:00  1.82   23.00  3.44  0.79  0.21  0.62  0.70  0.07  0.04   838.0  133.0
  4       .  11AUG79:18:00  11AUG79:19:05  1.95   30.00  2.27  1.39  0.25  0.50  0.37  0.24  0.03   217.0   68.2
  5       .  19AUG79:22:20  19AUG79:22:50  1.41    4.70  1.34  0.81  0.29  0.33  0.15  0.05  0.03   116.0   41.1
  6       .  21AUG79:06:00  21AUG79:07:15  1.41    4.70  1.00  0.81  0.23  0.39  0.08  0.04  0.04    31.0   36.8
  7       .  24AUG79:18:30  24AUG79:20:45  1.67   15.00     .     .  0.14  0.08     .     .  0.04     5.6   30.4
  8       .  26AUG79:01:50  26AUG79:20:45  1.61   12.00     .     .  0.22  0.42     .     .  0.03   295.0   49.6
  9       .  27AUG79:16:00  28AUG79:18:20  1.78   20.00     .     .  0.26  0.24     .     .  0.07   132.0   17.6
 10       .  30SEP79:23:45  02OCT79:10:00  2.75  105.00  1.02  0.47  0.19  0.22     .     .  0.10   271.0   54.6
 11       .  02OCT79:21:00  03OCT79:11:00  1.78   34.00  0.49  0.47  0.11  0.20     .     .  0.06    33.0   34.6
 12       .  05OCT79:09:10  06OCT79:01:00  1.89   41.00  0.76  0.50  0.17  0.29  0.13  0.06  0.06    86.0   18.5
 13       .  09OCT79:02:20  09OCT79:04:30  1.83   37.00  0.73  0.46  0.15  0.56  0.13  0.05  0.04    90.0   51.6
 14       .  10OCT79:01:25  11OCT79:22:05  2.09   57.00  0.69  0.50  0.15  0.34  0.11  0.06  0.06    60.0   31.7
 15       .  13OCT79:08:00  14OCT79:01:55  1.86   39.00  0.42  0.38  0.13  0.15  0.06  0.05  0.03    12.4   25.1
 16       .  10NOV79:03:25  10NOV79:04:35  1.68   28.00  0.50  0.48  0.18  0.10  0.06  0.04  0.04    13.2   39.6
 17       .  11NOV79:14:45  12NOV79:10:00  1.85   38.00  0.58  0.48  0.16  0.08  0.06  0.04  0.03    21.6   33.0
 18       .  26NOV79:05:15  27NOV79:14:00  1.57   22.00  0.25  0.25  0.17  0.14  0.03  0.03  0.01     3.0   26.4
 19    11.0  11JAN80:14:50  11JAN80:18:00  1.68   28.00  0.81  0.51  0.17  0.44  0.11  0.05  0.03    79.0   37.9
 20    65.0  05MAR80:12:15  06MAR80:11:10  1.71   30.00  0.64  0.47  0.14  0.42  0.09  0.06  0.03    45.0   16.1
 21    81.0  21MAR80:00:45  22MAR80:12:05  1.87   40.00  0.94  0.65  0.19  0.33  0.11  0.05  0.04    32.0      .
 22    88.0  28MAR80:18:00  30MAR80:05:00  1.74   38.00  0.55  0.44  0.13  0.26  0.07  0.06  0.02     9.3      .
 23   115.0  24APR80:18:30  25APR80:13:20  1.56   21.80  3.15  1.23  0.60  0.82  0.49  0.08  0.06   356.0  108.0
 24   118.0  27APR80:18:50  27APR80:19:20  1.94   45.20  0.89  0.53  0.18  0.25  0.08  0.04  0.04    58.0   19.0
 25   123.0  02MAY80:12:10  03MAY80:00:05  1.58   23.10  0.71  0.48  0.13  0.21  0.08  0.03  0.02    37.0      .
 26   141.0  20MAY80:22:00  21MAY80:12:00  1.75   32.00  0.85  0.53  0.21  0.31  0.10  0.04     .    99.0   16.8
 27   155.0  03JUN80:17:30  03JUN80:18:05  1.96   46.60     .  1.19  0.15  0.42     .  0.06  0.05  1870.0  392.0
 28   155.1  03JUN80:18:10  03JUN80:19:00  2.05   54.00  4.33  1.39  0.41  0.50  0.93  0.10  0.10   915.0  140.0
 29   167.0  15JUN80:17:30  15JUN80:20:15  1.58   23.00  2.00  0.70  0.13  0.19  0.35  0.07  0.02   290.0   69.6
 30   185.0  03JUL80:06:00  03JUL80:11:00  1.63   13.00  2.35  0.75  0.13  0.64  0.49  0.06  0.01   472.0  120.0
 31   185.1  03JUL80:13:30  03JUL80:15:10  1.95   29.60  2.28  0.66  0.19  0.54  0.58  0.08  0.05   756.0   96.0
 32   187.0  05JUL80:14:40  05JUL80:16:00  1.78   20.50  1.21  0.53  0.19  0.31  0.24  0.07  0.04   241.0   56.0
 33   190.0  08JUL80:05:00  08JUL80:10:55  1.56   10.00  0.66  0.48  0.18  0.32  0.10  0.04  0.04    72.0   32.0
 34   190.1  08JUL80:14:05  09JUL80:08:00  1.79   21.00  1.25  0.51  0.26  0.57  0.28  0.07  0.07   345.0   20.0
 35   193.0  11JUL80:16:55  11JUL80:18:05  1.91   27.60  1.32  0.53  0.16  0.37  0.18  0.05  0.00   192.0      .
 36   199.0  17JUL80:11:58  18JUL80:01:00  1.51    8.09  0.67  0.57  0.14  0.25  0.08  0.05  0.00    36.0   23.0
 37   216.1  03AUG80:22:50  04AUG80:02:10  1.50    7.56  1.01  0.51  0.16  0.24  0.17  0.05  0.02   121.0   33.4
 38   218.0  05AUG80:15:20  06AUG80:12:35  1.62   12.60  4.07  0.71  0.28  0.53  0.88  0.09  0.07  1250.0   52.0
 39   292.0  18OCT80:17:32  20OCT80:02:00  1.65   14.50  3.24  1.64  1.11  0.88  1.40  0.70  0.60   692.0   87.0
 40   322.0  17NOV80:16:30  18NOV80:13:00  1.53    8.96  0.72  0.59  0.34  0.40  0.11     .  0.10    48.0    0.0
 41   329.0  24NOV80:06:30  25NOV80:11:10  2.44   68.90  0.72  0.50  0.22  0.48  0.16  0.09  0.09    76.0   22.0
 42    33.0  02FEB81:06:35  02FEB81:14:00  1.37    3.80  1.97  0.89  0.24  0.57  0.43  0.10  0.09   342.0   71.0
 43    51.0  20FEB81:00:25  21FEB81:11:35  1.36    3.71  0.67  0.45  0.29  0.52  0.10  0.05  0.05    72.0   26.0
 44    53.0  22FEB81:23:35  25FEB81:06:50  1.64   13.50  1.59  0.47  0.42  0.47  0.32  0.07     .   567.0      .
 45    91.0  01APR81:16:30  01APR81:18:05  1.37    3.88  0.79  0.52  0.27     .  0.06  0.04  0.04    27.0   27.0
 46    95.0  05APR81:18:20  06APR81:08:25  1.36    3.61  1.01  0.80  0.56     .  0.06  0.06     .    60.0   26.7
 47   121.0  01MAY81:09:10  02MAY81:12:55  1.62   13.10  3.46  0.76  0.26  0.52  0.63  0.07  0.02   692.0  112.0
 48   130.0  10MAY81:20:15  10MAY81:20:30  1.37    3.85  1.63  0.33  0.18  0.42  0.37  0.04  0.02   357.0   59.3
 49   131.1  11MAY81:11:20  13MAY81:01:00  1.57   11.30  3.45  0.54  0.22  0.42  0.87  0.04  0.04  1040.0  149.0
 50   148.0  28MAY81:08:26  28MAY81:14:35  1.31    2.52  1.21  0.54     .  0.28  0.16  0.06     .   180.0   49.7
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APPENDIX H

WATER QUALITY DATA COLLECTED AT OCCOQUAN STREAM STATIONS
DURING THE PERIOD MAY 1979-MAY 1981

STA=51ST10

OBS	STRMNO	TI1	TI2	STG	FLO	TKN	SKN	NH3	NO23	TP	TSP	OP	TSS	COD
51	.	13MAY79:15:55	16MAY79:11:00	3.54	537.0	1.03	0.65	0.14	0.10	0.11	0.04	0.04	116.0	40.3
52	.	24MAY79:09:00	28MAY79:05:00	3.52	529.0	1.33	0.97	0.21	0.32	0.12	0.09	0.02	23.2	38.0
53	.	31MAY79:22:00	02JUN79:13:50	9.50	4669.0	1.24	0.96	0.30	1.26	0.12	0.08	0.08	246.0	35.0
54	.	04JUN79:09:10	05JUN79:04:40	6.58	2330.0	0.84	0.61	0.22	1.84	0.13	0.09	0.05	48.0	44.0
55	.	29JUL79:10:20	30JUL79:15:30	1.99	112.0	1.72	0.99	0.13	0.07	0.13	0.05	0.05	17.2	57.3
56	.	31JUL79:00:10	01AUG79:09:00	2.00	113.0	1.03	0.66	0.17	0.07	0.10	0.06	0.03	14.0	47.8
57	.	02AUG79:19:00	03AUG79:23:30	3.74	617.0	0.85	0.47	.	.	0.07	0.03	.	17.2	20.0
58	.	12AUG79:12:40	14AUG79:19:50	2.80	290.0	1.49	0.99	0.24	0.44	0.12	0.07	0.03	16.7	44.1
59	.	21AUG79:08:00	23AUG79:04:00	3.52	527.0	0.99	0.62	0.07	0.32	0.12	0.07	0.02	28.0	30.4
60	.	24AUG79:07:15	25AUG79:12:50	4.11	782.0	1.03	0.77	0.07	0.32	0.14	0.09	0.03	22.4	20.8
61	.	25AUG79:17:30	31AUG79:13:00	5.91	1794.0	1.28	0.91	0.07	0.26	0.22	0.10	0.04	79.0	43.2
62	.	04SEP79:11:00	10SEP79:04:00	7.40	2989.0	1.14	0.92	0.19	0.49	0.22	0.13	0.07	150.0	29.0
63	.	13SEP79:14:45	13SEP79:21:00	3.07	371.0	0.81	0.81	0.17	0.56	0.06	0.06	0.03	21.2	41.1
64	.	14SEP79:01:55	16SEP79:00:00	2.39	186.0	0.54	0.54	0.09	0.48	0.04	0.04	0.02	12.4	32.0
65	.	21SEP79:15:40	24SEP79:05:15	10.24	5264.0	1.34	0.71	0.17	0.38	0.28	0.11	0.11	189.0	44.9
66	.	24OCT79:01:55	26OCT79:01:30	3.00	349.0	0.59	0.39	0.09	0.47	0.08	0.04	0.01	52.0	28.4
67	.	02NOV79:17:15	04NOV79:17:05	2.32	451.0	0.48	0.34	0.09	0.01	0.07	0.05	0.01	10.0	21.8
68	.	12NOV79:01:10	12NOV79:17:30	3.47	504.0	0.85	0.61	0.19	0.15	0.11	0.06	0.04	27.0	46.2
69	18	18JAN80:10:45	22JAN80:15:00	7.83	3096.0	1.30	0.70	0.10	0.86	0.22	0.06	0.06	235.0	40.5
70	22	22JAN80:15:10	24JAN80:14:00	4.34	886.0	.	.	0.19	0.87	0.21	0.03	0.03	192.0	43.1
71	56	25FEB80:11:55	27FEB80:11:30	3.05	364.0	1.76	0.62	0.15	0.57	0.21	0.04	0.01	58.0	20.8
72	64	04MAR80:15:45	07MAR80:08:40	4.19	824.0	1.04	0.39	0.14	0.58	0.25	0.05	0.04	390.0	28.0
73	73	13MAR80:18:30	15MAR80:17:00	6.89	2581.0	1.75	1.16	0.24	0.79	0.31	0.09	0.06	334.0	38.0
74	81	21MAR80:16:45	23MAR80:13:00	6.37	2162.0	2.15	0.78	0.14	0.65	0.63	0.08	0.04	972.0	.
75	85	25MAR80:01:00	26MAR80:11:00	4.03	736.0	1.19	0.65	0.17	0.61	0.22	0.08	0.03	245.0	.
76	88	28MAR80:12:05	31MAR80:10:00	4.82	1129.0	1.54	0.78	0.30	0.64	0.42	0.07	0.06	615.0	26.8
77	95	04APR80:10:40	06APR80:11:15	3.84	651.0	4.03	0.62	0.12	0.57	1.41	0.13	0.11	1640.0	68.0
78	100	09APR80:00:30	11APR80:10:45	5.43	1471.0	4.67	0.53	0.20	0.51	1.80	0.22	0.14	2540.0	70.0
79	105	14APR80:08:00	16APR80:01:00	4.14	798.0	1.00	0.53	.	.	0.12	0.04	.	130.0	36.0
80	119	28APR80:17:00	29APR80:21:30	6.03	1895.0	4.02	0.82	0.43	0.49	1.50	.	0.18	2800.0	110.0
81	121	30APR80:00:10	01MAY80:10:30	4.66	1040.0	3.68	0.84	0.33	0.53	1.21	.	0.11	2160.0	90.0
82	139	18MAY80:13:00	19MAY80:17:10	2.55	224.0	1.32	0.45	0.13	0.17	0.20	0.03	0.02	198.0	36.0
83	141	20MAY80:21:00	22MAY80:06:05	4.62	1030.0	2.74	0.76	0.31	0.58	0.51	0.04	0.04	115.0	64.8
84	145	24MAY80:22:00	26MAY80:06:00	3.88	669.0	1.62	0.61	0.21	0.68	0.32	0.05	0.04	266.0	31.2
85	191	09JUL80:11:25	11JUL80:11:30	2.10	133.0	2.06	0.51	0.13	0.11	0.47	0.06	0.03	387.0	48.0
86	329	24NOV80:10:50	26NOV80:07:00	1.46	44.2	0.45	0.43	0.06	0.08	0.04	0.03	0.01	5.0	16.0
87	42	11FEB81:08:40	12FEB81:09:20	4.18	818.0	0.94	0.68	0.24	0.59	0.16	0.06	0.04	58.0	36.0
88	50	19FEB81:21:00	22FEB81:00:50	3.98	720.0	1.56	1.28	0.72	3.08	0.19	0.11	0.10	35.0	39.0

APPENDIX H

WATER QUALITY DATA COLLECTED AT OCCOQUAN STREAM STATIONS
DURING THE PERIOD MAY 1979-MAY 1981

STA=51ST20

OBS	STRMNO	TI1	TI2	STG	FLD	TKN	SKN	NH3	NO23	TP	TSP	OP	TSS	COD
89	.	13MAY79:15:45	16MAY79:09:25	3.90	237.0	2.67	1.40	0.31	0.52	0.52	0.12	0.12	446.0	91.5
90	.	19MAY79:02:10	20MAY79:23:00	2.58	40.0	1.06	0.97	0.22	0.49	0.10	0.09	0.03	10.0	47.0
91	.	23MAY79:20:15	28MAY79:21:00	3.39	146.0	1.31	1.08	0.25	0.50	0.16	0.09	0.06	60.0	41.0
92	.	14JUL79:06:00	16JUL79:10:15	2.53	35.0	2.89	2.43	0.52	0.13	0.20	0.12	0.05	13.0	54.0
93	.	29JUL79:01:00	29JUL79:09:00	3.82	221.0	1.06	0.74	0.23	0.20	0.11	0.05	0.04	42.0	47.8
94	.	30JUL79:08:55	31JUL79:13:00	3.01	92.0	1.31	0.51	0.31	0.53	0.17	0.10	0.06	37.0	51.0
95	.	19AUG79:17:20	20AUG79:15:10	2.57	32.0	1.94	1.45	0.25	0.41	0.23	0.12	0.07	53.0	74.2
96	.	23AUG79:22:05	25AUG79:01:30	5.17	523.0	1.53	0.89	0.11	0.39	0.28	0.10	0.07	171.0	40.0
97	.	25AUG79:17:55	30AUG79:15:15	9.74	2793.0	2.07	0.91	0.11	0.49	0.52	0.15	0.10	405.0	43.2
98	.	05SEP79:12:15	09SEP79:20:00	8.87	2044.0	1.28	0.85	0.18	0.57	0.24	0.15	0.09	99.0	47.1
99	.	15SEP79:04:00	15SEP79:18:00	3.28	87.0	1.14	0.52	0.09	0.51	0.09	0.05	0.03	4.4	13.9
100	.	21SEP79:17:30	26SEP79:12:00	8.62	1886.0	1.30	0.71	0.13	0.40	0.27	0.14	0.12	143.0	31.8
101	.	01OCT79:00:15	02OCT79:20:00	12.68	7494.0	1.54	0.67	0.21	0.45	.	.	0.15	291.0	51.5
102	.	03OCT79:00:10	04OCT79:15:00	6.93	1040.0	1.12	0.84	0.09	0.31	.	.	0.04	40.0	44.4
103	.	05OCT79:08:20	08OCT79:02:05	8.08	1582.0	1.34	0.79	0.05	0.55	.	.	0.07	197.0	47.6
104	.	09OCT79:04:15	11OCT79:23:00	8.91	2074.0	0.76	0.59	0.13	0.47	0.13	0.08	0.07	41.0	41.7
105	.	12OCT79:12:50	15OCT79:07:10	4.90	459.0	0.58	0.53	0.13	0.69	0.07	0.05	0.04	14.4	21.8
106	.	24OCT79:01:30	24OCT79:14:30	3.81	220.0	0.57	0.46	0.09	0.32	0.07	0.05	0.02	11.6	28.4
107	.	02NOV79:22:55	04NOV79:13:00	4.44	348.0	0.67	0.48	0.11	0.30	0.11	0.07	0.03	20.8	41.7
108	.	10NOV79:09:00	11NOV79:13:00	4.58	372.0	0.63	0.29	0.11	0.35	0.09	0.06	0.03	14.4	39.6
109	.	11NOV79:15:50	13NOV79:05:00	6.53	901.0	1.05	0.75	0.17	0.52	0.22	0.12	0.06	77.0	59.4
110	.	26NOV79:06:30	28NOV79:11:05	4.42	338.0	0.86	0.53	0.15	0.45	0.15	0.09	0.07	38.0	59.4
111	18	18JAN80:15:00	22JAN80:19:00	8.35	1730.0	1.36	0.73	0.10	0.94	0.23	0.09	0.09	110.0	67.0
112	22	22JAN80:14:00	24JAN80:13:00	4.49	357.0	.	.	0.17	1.15	0.08	0.05	0.04	63.0	24.2
113	81	21MAR80:06:00	25MAR80:13:30	6.56	912.0	1.55	1.10	0.08	0.68	0.23	0.10	0.01	109.0	.
114	84	24MAR80:23:50	26MAR80:05:00	4.66	399.0	0.63	0.56	0.15	0.82	0.09	0.07	0.03	22.5	.
115	117	26APR80:21:15	28APR80:09:45	4.88	443.0	1.22	0.96	0.28	0.46	0.16	0.08	0.06	64.0	10.0
116	119	28APR80:16:30	29APR80:17:10	5.94	723.0	1.30	1.04	0.27	0.67	0.17	0.11	0.09	43.0	40.0
117	121	30APR80:05:40	01MAY80:00:30	5.47	595.0	0.95	0.74	0.15	0.57	0.13	0.08	0.05	29.0	24.0
118	122	01MAY80:15:00	02MAY80:10:40	4.45	345.0	0.80	0.73	0.15	0.49	0.09	0.06	0.04	14.7	32.0
119	139	18MAY80:08:10	19MAY80:12:30	3.57	175.0	0.87	0.64	0.19	0.31	0.08	0.05	0.02	11.8	26.4
120	141	20MAY80:09:00	22MAY80:06:00	4.94	463.0	1.07	1.01	0.35	1.38	0.10	0.08	0.07	72.0	50.4
121	145	24MAY80:23:10	27MAY80:03:00	3.92	241.0	1.15	0.71	0.27	0.85	0.22	0.07	0.07	79.0	26.4
122	190	08JUL80:15:15	10JUL80:21:00	3.06	66.4	1.51	1.29	0.86	0.37	0.10	0.05	0.01	17.0	34.0
123	292	18OCT80:11:10	19OCT80:16:00	2.22	14.9	1.70	1.17	0.53	0.15	0.27	0.13	0.05	62.0	42.0
124	299	25OCT80:07:15	27OCT80:14:35	2.28	17.5	1.49	1.01	0.33	0.94	0.27	0.17	0.09	18.0	40.0
125	329	24NOV80:16:35	26NOV80:09:00	2.70	40.4	1.39	0.97	0.26	2.02	0.18	0.11	0.09	44.0	20.0
126	33	02FEB81:10:00	04FEB81:14:05	2.60	33.5	2.09	1.05	0.32	0.63	0.20	0.08	0.04	49.0	49.0
127	42	11FEB81:03:15	13FEB81:08:30	5.17	496.0	3.36	2.19	0.68	2.23	0.87	0.30	0.21	610.0	84.0
128	54	23FEB81:10:00	26FEB81:14:00	5.57	332.0	1.58	1.13	0.52	4.00	0.13	0.09	0.07	61.0	29.0
129	64	05MAR81:08:50	09MAR81:13:15	2.83	49.3	0.85	0.85	0.43	2.54	0.02	0.01	0.01	5.0	8.0
130	92	02APR81:14:00	07APR81:11:45	2.45	26.0	0.77	0.59	0.09	0.12	0.08	0.05	0.01	2.0	20.0
131	103	13APR81:08:35	16APR81:13:15	2.88	53.0	0.71	0.57	0.18	0.15	0.06	0.05	0.01	4.0	24.0
132	109	19APR81:11:00	20APR81:05:30	2.94	57.8	0.82	.	0.15	0.07	0.06	0.05	0.01	2.0	24.0
133	121	01MAY81:13:55	05MAY81:10:00	3.76	154.0	2.60	1.02	0.28	0.54	0.49	0.11	0.10	274.0	52.0
134	131	11MAY81:21:35	14MAY81:03:55	3.51	113.0	1.52	1.05	0.34	0.40	0.26	0.12	0.10	145.0	33.8
135	140	20MAY81:01:00	21MAY81:13:20	2.95	58.3	1.25	1.17	0.38	0.58	0.07	0.09	0.04	13.0	19.9
136	148	28MAY81:20:30	01JUN81:03:40	3.31	90.3	3.46	1.30	0.61	1.69	0.65	0.14	.	168.0	69.6

APPENDIX H

WATER QUALITY DATA COLLECTED AT OCCOQUAN STREAM STATIONS
DURING THE PERIOD MAY 1979-MAY 1981

STA=51ST30

OBS	STRMNO	TI1	TI2	STG	FLO	TKN	SKN	NH3	NO23	TP	TSP	OP	TSS	COD
137	.	02AUG79:18:00	02AUG79:18:50	2.78	92	2.10	0.86	0.37	0.37	0.12	0.04	0.03	32.0	20.0
138	.	03AUG79:05:10	04AUG79:03:55	2.77	90	1.08	0.71	.	.	0.08	0.04	.	22.4	20.0
139	.	21AUG79:07:15	23AUG79:14:15	3.19	193	1.87	1.56	0.18	0.52	0.34	0.18	0.12	125.0	26.0
140	.	05SEP79:12:10	07SEP79:10:20	9.83	2505	1.17	0.72	0.10	0.35	0.13	0.07	0.02	38.0	23.0
141	.	21SEP79:18:30	24SEP79:13:25	8.27	1846	1.68	1.05	0.29	0.36	0.31	0.11	0.09	231.0	38.3
142	.	26NOV79:06:00	27NOV79:02:00	3.17	218	0.68	0.51	0.29	0.37	0.06	0.04	0.02	15.5	42.8
143	11	11JAN80:19:00	14JAN80:14:20	3.24	236	1.23	0.90	0.36	0.32	0.08	0.04	0.03	32.0	23.4
144	119	28APR80:15:17	29APR80:06:30	4.17	477	1.00	0.67	0.16	0.33	0.10	0.05	0.03	55.0	22.4
145	142	21MAY80:00:10	22MAY80:07:30	4.26	501	0.74	0.55	0.17	0.58	0.07	0.02	0.02	.	46.8
146	145	24MAY80:16:45	25MAY80:07:40	4.07	449	0.96	0.86	0.45	0.40	0.09	0.05	0.03	12.0	10.3
147	51	20FEB81:05:40	21FEB81:15:10	3.14	180	1.20	1.13	0.58	1.58	0.09	0.05	0.04	16.0	27.0
148	54	23FEB81:10:30	25FEB81:10:30	3.05	158	0.86	0.86	0.42	1.86	0.09	0.07	0.05	7.0	45.3
149	64	05MAR81:09:30	09MAR81:13:00	2.89	116	0.83	0.74	0.12	1.36	0.17	0.02	0.02	6.0	0.0
150	121	01MAY81:13:30	04MAY81:09:10	3.26	211	0.95	0.76	0.20	0.66	0.07	0.04	0.02	25.0	44.0

STA=51ST40

OBS	STRMNO	TI1	TI2	STG	FLO	TKN	SKN	NH3	NO23	TP	TSP	OP	TSS	COD
151	.	30JUL79:13:25	31JUL79:23:50	3.34	116.0	0.67	0.56	0.13	3.12	0.04	0.03	0.02	9.2	20.0
152	.	02AUG79:17:00	06AUG79:15:50	5.25	520.0	0.84	0.69	.	.	0.07	0.05	.	13.6	35.1
153	.	12AUG79:00:00	15AUG79:10:00	4.21	274.0	1.76	1.20	0.20	0.82	0.17	0.08	0.06	99.0	41.1
154	.	19AUG79:21:40	20AUG79:19:50	3.54	148.0	1.02	0.76	0.28	1.85	0.18	0.08	0.04	117.0	32.0
155	.	21AUG79:12:30	23AUG79:07:00	3.81	194.0	1.45	1.07	0.14	0.72	0.12	0.08	0.03	40.0	29.0
156	.	27AUG79:17:10	30AUG79:12:50	4.96	448.0	0.77	0.62	0.12	1.14	0.10	0.09	0.03	36.0	30.4
157	.	05OCT79:11:00	06OCT79:09:00	9.78	2681.0	1.27	0.71	0.15	0.47	.	.	0.09	113.0	35.1
158	.	02NOV79:21:00	03NOV79:10:10	3.68	172.0	0.51	0.36	0.16	0.99	0.06	0.05	0.01	3.5	46.2
159	.	13DEC79:18:00	15DEC79:18:00	3.99	229.0	0.82	0.65	0.17	0.67	0.06	0.05	0.01	15.4	.
160	65	05MAR80:11:00	06MAR80:06:55	5.69	641.0	0.72	0.53	0.09	1.07	0.12	0.06	0.02	.	.
161	71	11MAR80:11:45	15MAR80:14:00	6.21	797.0	1.18	0.66	0.20	0.67	0.21	0.06	0.04	232.0	30.0
162	80	20MAR80:12:50	23MAR80:12:00	7.48	1223.0	1.44	0.94	0.20	1.04	0.17	0.07	0.05	169.0	.
163	85	25MAR80:02:30	28MAR80:10:00	4.58	352.0	0.66	0.55	0.15	1.24	0.08	0.07	0.02	18.0	15.6
164	89	29MAR80:02:00	30MAR80:20:30	7.08	1086.0	1.20	0.48	0.17	0.81	0.18	0.06	0.05	116.0	28.8
165	91	31MAR80:07:15	02APR80:04:50	6.78	986.0	0.84	0.72	0.18	1.00	0.07	0.04	0.04	72.0	24.0
166	93	02APR80:14:30	05APR80:15:55	5.20	507.0	0.68	0.64	0.22	2.50	0.05	0.03	0.03	18.0	16.0
167	117	26APR80:15:00	28APR80:13:00	5.66	632.0	0.99	0.70	0.18	0.38	0.11	0.04	0.02	72.0	28.8
168	119	28APR80:15:00	29APR80:19:00	7.88	1370.0	1.32	0.87	0.21	0.41	0.19	0.07	0.07	158.0	40.0
169	121	30APR80:11:00	01MAY80:02:30	5.84	682.0	0.87	0.85	0.15	0.65	0.13	0.07	0.05	25.0	24.0
170	122	01MAY80:08:05	03MAY80:18:00	5.33	537.0	0.69	0.66	0.11	0.53	0.07	0.06	0.03	15.0	19.2
171	141	20MAY80:19:05	21MAY80:13:50	4.77	393.0	0.66	0.55	0.13	1.34	0.05	0.03	0.02	20.5	22.0
172	154	02JUN80:23:00	03JUN80:12:45	3.23	102.0	0.64	0.50	0.19	2.19	0.06	0.04	0.03	21.0	52.0
173	155	03JUN80:13:00	04JUN80:02:30	3.29	110.0	0.69	0.54	0.13	1.97	0.14	0.06	0.03	10.0	20.6
174	159	07JUN80:19:15	08JUN80:04:30	3.38	122.0	0.55	0.45	0.10	2.56	0.06	0.04	0.02	24.0	14.4
175	185	03JUL80:05:30	04JUL80:11:00	3.43	129.0	0.68	0.51	0.14	3.74	0.05	0.04	0.00	11.4	20.0
176	33	02FEB81:08:15	02FEB81:20:50	3.31	96.7	0.74	0.70	0.04	10.58	0.07	0.04	0.02	25.0	14.0
177	51	20FEB81:03:00	22FEB81:18:00	5.34	497.0	1.24	0.98	0.34	2.82	0.10	0.04	0.04	24.0	24.0
178	54	23FEB81:13:20	25FEB81:20:25	5.91	655.0	1.54	0.89	0.30	2.13	0.20	0.05	0.04	244.0	24.7
179	64	05MAR81:09:45	06MAR81:22:15	3.65	142.0	0.85	0.74	0.09	3.42	0.02	0.00	0.00	12.0	12.0
180	103	13APR81:12:10	15APR81:19:10	4.39	269.0	0.86	0.63	0.10	2.66	0.07	0.04	0.02	29.0	24.0

APPENDIX H

WATER QUALITY DATA COLLECTED AT OCCOQUAN STREAM STATIONS
DURING THE PERIOD MAY 1979-MAY 1981

STA=51ST40

OBS	STRMNO	TI1	TI2	STG	FLO	TKN	SKN	NH3	NO23	TP	TSP	OP	TSS	COD
181	121	01MAY81:12:05	03MAY81:13:55	5.70	596	1.92	0.85	0.20	2.41	0.41	0.06	.	348	51.5
182	131	11MAY81:05:50	13MAY81:17:30	4.35	270	0.84	0.58	0.12	2.05	0.10	0.06	0.04	58	21.9

STA=51ST50

OBS	STRMNO	TI1	TI2	STG	FLO	TKN	SKN	NH3	NO23	TP	TSP	OP	TSS	COD
183	.	23MAY79:21:45	27MAY79:23:00	2.65	44.0	1.02	0.86	0.09	0.64	0.07	0.05	0.01	9.6	32.1
184	.	11JUN79:16:30	12JUN79:12:10	2.33	27.0	0.72	0.72	0.04	1.46	0.06	0.06	0.00	6.2	19.5
185	.	12AUG79:07:50	14AUG79:08:00	2.81	55.0	0.95	0.40	0.04	0.26	0.17	0.14	0.02	164.0	29.0
186	.	19AUG79:20:00	20AUG79:14:30	2.58	39.0	0.87	0.64	0.09	0.24	0.10	0.05	0.03	33.0	32.0
187	.	21AUG79:07:50	23AUG79:10:30	2.48	33.0	0.87	0.79	0.06	0.38	0.10	0.06	0.05	15.0	20.0
188	.	05SEP79:17:15	07SEP79:09:45	9.13	1347.0	1.23	0.83	0.16	0.45	0.20	0.11	0.06	60.0	32.0
189	.	23OCT79:16:45	24OCT79:13:15	3.54	123.0	0.78	0.51	0.09	0.65	0.09	0.06	0.04	20.8	38.4
190	.	02NOV79:22:50	03NOV79:04:55	2.93	64.0	0.48	0.44	0.09	0.32	0.07	0.06	0.02	4.8	13.5
191	.	10NOV79:08:15	11NOV79:04:50	4.18	203.0	0.67	0.63	0.15	0.34	0.08	0.06	0.04	11.4	49.5
192	.	11NOV79:18:20	13NOV79:02:15	5.30	366.0	0.90	0.65	0.13	0.32	0.11	0.06	0.04	21.6	56.1
193	.	13DEC79:15:00	17DEC79:13:00	3.01	71.0	0.71	0.58	0.09	0.35	0.07	0.05	0.02	10.8	7.4
194	11	11JAN80:15:45	14JAN80:09:00	4.05	192.0	0.94	0.75	0.24	0.80	0.11	0.07	0.06	34.0	47.4
195	14	14JAN80:15:00	16JAN80:12:00	4.24	199.0	0.85	0.59	0.19	0.94	0.08	0.07	0.07	11.2	41.8
196	56	25FEB80:06:50	26FEB80:15:10	2.77	52.0	1.45	0.63	0.13	0.66	0.08	0.05	0.01	5.2	30.4
197	65	05MAR80:10:00	06MAR80:22:15	4.29	215.0	0.74	0.59	0.08	0.54	0.09	0.04	0.02	52.0	11.3
198	72	12MAR80:22:00	15MAR80:07:00	4.74	278.0	1.26	0.91	0.24	1.31	0.10	0.03	0.03	73.0	43.2
199	81	21MAR80:06:50	24MAR80:12:30	2.46	241.0	1.18	0.84	0.18	0.74	0.14	0.08	0.08	55.0	30.0
200	88	28MAR80:23:00	29MAR80:19:15	6.01	491.0	0.92	0.81	0.17	0.63	0.08	0.05	0.04	30.0	19.6
201	89	29MAR80:23:05	30MAR80:09:55	5.99	488.0	0.96	0.83	0.17	0.82	0.11	0.10	0.06	21.5	.
202	91	31MAR80:10:30	01APR80:11:10	5.01	321.0	0.94	0.85	0.23	0.86	0.10	0.08	0.05	19.3	.
203	95	04APR80:08:00	06APR80:04:00	3.39	107.0	0.86	0.77	0.19	0.87	0.07	0.07	0.07	9.0	20.0
204	100	09APR80:11:00	11APR80:13:00	4.29	217.0	0.74	0.58	0.17	0.60	0.10	0.06	0.06	26.0	0.0
205	105	14APR80:17:00	16APR80:09:05	3.11	79.9	0.55	0.42	0.13	0.51	0.11	0.09	0.02	3.0	24.0
206	117	26APR80:13:45	27APR80:15:00	3.99	175.0	.	.	0.20	0.35	.	.	0.01	21.0	26.0
207	118	27APR80:18:05	28APR80:01:00	4.97	310.0	0.97	0.80	0.22	0.42	0.10	0.06	0.04	30.0	20.0
208	122	01MAY80:04:30	02MAY80:09:00	4.79	286.0	0.80	0.76	0.17	0.53	0.09	0.07	0.05	13.0	14.0
209	139	18MAY80:08:00	19MAY80:14:00	2.64	43.0	0.24	0.13	0.03	0.55	0.04	0.04	0.02	33.0	.
210	140	19MAY80:17:00	20MAY80:03:05	3.47	116.0	0.91	0.64	0.17	0.50	0.11	0.05	0.05	48.0	43.2
211	141	20MAY80:22:05	22MAY80:08:30	4.68	272.0	0.99	0.95	0.21	1.03	0.09	0.05	0.05	33.0	43.2
212	145	24MAY80:09:00	26MAY80:14:10	3.15	83.9	0.92	0.75	0.19	1.94	0.08	0.06	0.04	14.0	20.0
213	159	07JUN80:17:05	07JUN80:22:58	2.24	21.0	0.47	0.45	0.12	0.63	0.05	0.05	0.04	1.0	12.0
214	167	15JUN80:18:10	16JUN80:08:00	1.94	9.0	0.41	0.37	0.07	0.42	0.07	0.05	0.03	5.0	17.2
215	185	03JUL80:08:00	04JUL80:18:00	1.99	14.6	0.51	0.47	0.05	0.36	0.09	0.05	0.02	12.5	8.0
216	190	08JUL80:10:59	10JUL80:18:30	2.53	39.2	0.61	0.46	0.11	0.41	0.14	0.08	0.07	36.0	36.0
217	203	21JUL80:21:00	22JUL80:14:00	3.98	200.0	0.81	0.50	0.16	0.49	0.21	0.11	0.10	129.0	34.0
218	204	22JUL80:20:40	23JUL80:13:55	3.00	77.6	0.89	0.52	0.18	0.55	0.20	.	0.15	78.0	17.4
219	269	25SEP80:14:25	25SEP80:18:00	2.22	22.4	0.42	0.42	0.09	0.19	0.06	0.05	0.02	5.0	20.6
220	299	25OCT80:08:30	28OCT80:09:45	2.39	30.6	0.54	0.40	0.08	0.13	0.02	0.02	0.02	12.0	18.0
221	329	24NOV80:10:40	26NOV80:12:50	2.98	76.7	0.74	0.70	0.14	0.74	0.11	0.08	0.08	34.0	20.0
222	51	20FEB81:01:30	22FEB81:10:30	3.99	199.0	.	.	0.07	1.12	.	.	0.04	31.0	.
223	54	23FEB81:15:40	26FEB81:08:30	3.78	173.0	0.78	0.69	0.28	1.54	0.10	0.06	0.05	29.0	37.0
224	64	05MAR81:12:40	09MAR81:08:30	2.45	34.2	0.67	0.67	0.09	1.38	0.03	0.02	0.02	6.0	12.0

APPENDIX H

WATER QUALITY DATA COLLECTED AT OCCOQUAN STREAM STATIONS
DURING THE PERIOD MAY 1979-MAY 1981

STA=51ST50

OBS	STRMNO	TI1	TI2	STG	FLO	TKN	SKN	NH3	NO23	TP	TSP	OP	TSS	COD
225	95	05APR81:08:45	07APR81:08:50	1.84	11.8	0.46	0.44	0.09	0.15	0.04	0.03	0.03	2	17.1
226	103	13APR81:03:25	16APR81:04:00	2.94	73.4	0.81	0.48	0.06	0.17	0.08	0.04	0.03	28	24.0
227	121	01MAY81:07:50	04MAY81:16:00	3.68	158.0	0.80	0.67	0.16	0.34	0.09	0.07	0.03	29	28.0
228	130	10MAY81:21:40	13MAY81:15:45	2.81	61.1	0.70	0.65	0.12	0.40	0.06	0.04	0.02	14	25.9

STA=51ST60

OBS	STRMNO	TI1	TI2	STG	FLO	TKN	SKN	NH3	NO23	TP	TSP	OP	TSS	COD
229	.	04MAY79:13:00	05MAY79:11:55	1.66	8.0	0.55	0.40	0.09	0.13	0.07	0.06	0.02	1.2	20.4
230	.	23MAY79:07:45	23MAY79:16:30	1.73	11.0	0.37	0.37	0.24	0.50	0.07	0.06	0.02	58.0	26.1
231	.	24MAY79:00:20	24MAY79:13:25	2.83	118.0	1.04	0.66	0.50	1.31	0.09	0.06	0.04	86.0	44.0
232	.	25MAY79:03:55	25MAY79:11:20	2.94	137.0	1.94	1.44	0.32	2.65	0.17	0.09	0.05	113.0	49.9
233	.	02JUN79:23:55	05JUN79:22:10	4.24	515.0	1.50	0.84	0.16	1.73	0.26	0.07	0.03	136.0	52.9
234	.	10JUN79:23:00	11JUN79:16:20	2.77	108.0	1.15	0.81	0.08	0.93	0.12	0.05	0.01	60.0	51.0
235	.	17JUN79:09:00	17JUN79:17:00	2.87	125.0	1.15	0.81	0.10	0.10	0.12	0.05	0.04	123.0	57.2
236	.	28JUL79:19:25	28JUL79:23:05	1.95	22.0	1.01	0.66	0.19	0.53	0.16	0.10	0.08	48.0	38.4
237	.	30JUL79:01:10	30JUL79:19:00	2.73	101.0	1.41	0.70	0.07	0.56	0.23	0.11	0.06	136.0	76.2
238	.	24AUG79:07:00	24AUG79:20:00	1.92	24.0	0.84	0.80	0.16	0.03	0.12	0.08	0.03	7.0	40.0
239	.	21SEP79:12:30	24SEP79:15:55	3.42	246.0	1.39	0.54	0.09	0.33	0.26	0.10	0.06	213.0	31.8
240	.	01OCT79:02:15	01OCT79:21:00	5.33	1066.0	0.79	0.52	0.09	0.45	0.14	0.07	0.05	93.0	31.8
241	.	05OCT79:08:05	07OCT79:07:00	3.61	304.0	1.17	0.88	0.07	0.37	.	.	0.06	110.0	35.0
242	.	09OCT79:01:30	09OCT79:03:30	3.12	173.0	0.75	0.55	0.07	0.59	.	.	0.05	36.0	28.4
243	.	10OCT79:19:10	11OCT79:11:00	4.26	522.0	0.52	0.49	0.07	0.37	.	.	0.05	18.5	25.1
244	.	23OCT79:17:00	24OCT79:12:20	1.92	20.0	0.30	0.30	0.07	0.21	0.04	0.03	0.02	2.0	5.3
245	.	02NOV79:18:20	04NOV79:08:05	2.27	47.0	0.53	0.46	0.10	0.15	0.07	0.06	0.03	6.4	23.4
246	.	11NOV79:16:15	12NOV79:12:20	3.01	150.0	0.90	0.60	0.13	0.24	0.11	0.06	0.05	32.0	42.8
247	.	26NOV79:06:00	27NOV79:03:25	2.69	95.0	0.37	0.35	0.11	0.30	0.06	0.04	0.02	11.0	36.3
248	.	13DEC79:14:15	14DEC79:08:30	2.30	50.0	0.71	0.51	0.12	0.36	0.07	0.05	0.02	8.2	11.4
249	11	11JAN80:06:00	11JAN80:13:00	2.77	107.0	1.15	0.84	0.14	0.55	0.10	0.06	0.05	52.0	27.4
250	14	14JAN80:15:45	15JAN80:11:30	3.18	187.0	0.93	0.59	0.14	0.82	0.10	0.07	0.06	30.0	47.0
251	18	18JAN80:12:20	20JAN80:07:00	3.77	351.0	1.23	0.70	0.06	0.82	0.18	0.08	0.06	92.0	44.3
252	53	22FEB80:08:00	22FEB80:19:05	1.91	20.0	0.65	0.65	0.15	0.61	0.05	0.04	0.01	7.6	13.2
253	65	05MAR80:06:45	07MAR80:02:45	2.27	47.0	0.59	0.57	0.18	0.67	0.06	0.05	0.02	15.0	3.8
254	73	13MAR80:18:15	15MAR80:09:50	2.96	141.0	1.18	0.68	0.16	0.91	0.16	0.05	0.03	145.0	32.0
255	75	15MAR80:13:15	16MAR80:09:05	3.01	149.0	0.76	0.54	0.16	0.81	0.07	0.04	0.03	32.0	28.0
256	81	21MAR80:05:15	22MAR80:19:00	3.72	337.0	1.74	0.85	0.14	0.87	0.37	0.11	0.11	296.0	60.0
257	88	28MAR80:22:45	30MAR80:06:00	3.31	217.0	1.09	0.74	0.15	0.67	0.15	0.08	0.04	61.0	20.0
258	91	31MAR80:00:15	31MAR80:11:50	3.67	320.0	1.05	0.77	0.16	0.80	0.13	0.08	0.06	34.0	.
259	95	04APR80:07:55	06APR80:21:00	2.25	45.0	0.66	0.66	0.13	0.60	0.06	0.05	0.03	3.5	8.4
260	100	09APR80:11:03	10APR80:21:00	3.40	240.0	1.88	1.43	0.78	0.47	0.60	0.49	0.42	119.0	34.0
261	105	14APR80:14:50	15APR80:09:50	3.62	305.0	1.27	1.08	0.41	0.47	0.22	0.17	0.15	41.0	30.0
262	117	26APR80:14:00	28APR80:00:10	2.63	88.3	0.99	0.55	0.16	0.38	0.10	0.05	0.03	36.0	46.0
263	119	28APR80:10:50	29APR80:13:30	3.29	212.0	0.93	0.68	0.18	0.48	0.10	0.05	0.04	37.0	46.0
264	121	30APR80:00:30	30APR80:17:50	2.75	105.0	0.71	0.65	0.17	0.57	0.08	0.06	0.03	12.0	28.0
265	122	01MAY80:00:15	02MAY80:01:00	2.97	143.0	0.74	0.59	0.17	0.49	0.08	0.06	0.03	18.0	16.0
266	133	12MAY80:23:56	14MAY80:10:05	1.82	15.0	0.40	0.35	0.11	0.65	0.04	0.03	0.02	8.0	12.0
267	139	18MAY80:10:00	19MAY80:09:05	1.86	17.0	0.74	0.28	0.15	0.79	0.08	0.04	0.03	19.7	20.0
268	141	20MAY80:21:50	22MAY80:00:30	3.44	253.0	2.53	1.99	0.70	3.53	0.23	0.10	0.10	836.0	48.0

APPENDIX H

WATER QUALITY DATA COLLECTED AT OCCOQUAN STREAM STATIONS
DURING THE PERIOD MAY 1979-MAY 1981

STA=51ST60

OBS	STRMNO	TI1	TI2	STG	FLO	TKN	SKN	NH3	NO23	TP	TSP	OP	TSS	COD
269	145	24MAY80:14:00	24MAY80:23:50	2.77	107.0	1.51	0.92	0.29	1.92	0.22	0.09	0.07	107.0	28.8
270	167	15JUN80:10:00	16JUN80:02:00	1.75	12.0	0.52	0.39	0.07	0.89	0.06	0.05	0.02	12.7	8.0
271	189	07JUL80:23:00	09JUL80:09:55	1.91	23.0	0.87	0.59	0.16	1.20	0.16	0.07	0.07	6.0	20.0
272	299	25OCT80:06:00	27OCT80:14:00	1.74	14.0	0.89	0.27	0.09	0.11	0.16	0.03	0.03	6.0	10.0
273	42	11FEB81:08:11	13FEB81:12:10	2.93	141.0	2.12	0.79	0.58	1.67	0.55	0.10	0.10	810.0	120.0
274	54	23FEB81:03:20	26FEB81:09:00	2.75	112.0	1.11	0.89	0.26	2.24	0.10	0.05	0.04	30.0	24.9
275	64	05MAR81:12:50	06MAR81:08:50	1.88	20.9	0.69	0.55	0.10	1.24	0.01	0.00	0.00	5.0	4.0
276	103	13APR81:00:45	14APR81:10:00	2.12	42.1	0.50	0.44	0.02	0.29	0.05	0.03	0.00	12.0	17.9
277	121	01MAY81:08:15	04MAY81:13:55	2.48	79.3	1.59	1.32	0.77	4.77	0.21	0.04	0.04	155.0	.
278	131	11MAY81:07:40	13MAY81:01:15	2.17	47.6	1.94	1.16	0.32	2.05	0.23	0.07	0.06	147.0	41.8

STA=51ST70

OBS	STRMNO	TI1	TI2	STG	FLO	TKN	SKN	NH3	NO23	TP	TSP	OP	TSS	COD
279	.	05MAY79:01:00	05MAY79:18:30	2.14	33.0	1.17	0.17	0.17	0.45	0.27	0.18	0.09	30.0	29.0
280	.	13MAY79:17:50	15MAY79:03:00	2.09	28.0	0.84	0.61	0.14	0.51	.	.	0.03	16.0	37.5
281	.	15MAY79:22:10	16MAY79:09:40	2.12	31.0	0.76	0.57	0.18	0.49	0.10	0.05	0.03	21.2	30.9
282	.	23MAY79:07:10	24MAY79:12:40	2.47	80.0	0.62	0.31	0.28	0.74	0.21	0.07	0.06	173.0	38.0
283	.	25MAY79:13:35	26MAY79:15:30	2.85	147.0	1.36	0.62	0.17	0.56	0.40	0.08	0.04	307.0	61.8
284	.	14JUL79:02:00	14JUL79:05:50	2.13	32.0	0.79	0.63	0.06	0.28	0.06	0.03	0.00	24.4	15.8
285	329	24NOV80:12:50	25NOV80:22:40	2.43	74.4	0.59	0.38	0.08	0.76	0.08	0.04	0.03	34.0	14.0
286	42	11FEB81:10:00	13FEB81:10:40	3.08	193.0	2.04	0.79	0.54	1.75	0.92	0.08	0.07	890.0	120.0
287	51	20FEB81:00:45	21FEB81:15:00	3.00	176.0	1.22	0.78	0.15	1.51	0.14	0.02	0.02	100.0	20.0
288	54	23FEB81:07:00	24FEB81:13:15	2.97	171.0	0.69	0.54	0.28	1.96	0.11	0.03	0.03	55.0	.
289	64	05MAR81:10:55	06MAR81:13:00	2.10	28.7	0.62	0.60	0.16	1.18	0.00	0.00	0.00	7.0	8.0
290	103	13APR81:09:20	14APR81:14:00	2.27	50.7	0.59	0.48	0.14	0.47	0.05	0.03	0.00	6.0	33.8
291	121	01MAY81:11:50	04MAY81:10:00	2.26	48.2	0.67	0.48	0.14	0.62	0.07	0.05	0.00	12.5	8.0
292	132	12MAY81:00:45	13MAY81:03:30	2.54	92.7	1.47	0.77	0.22	0.78	0.40	0.09	0.07	177.0	31.7

Appendix I

Analysis of liquid manure spread on site 2[a]

Parameter	Concentration
Total Kjeldahl nitrogen	4700 mg/L as N
Soluble Kjeldahl nitrogen	3500 mg/L as N
Ammonia	2880 mg/L as N
Oxidized nitrogen	negligible
Total phosphorus	1100 mg/L as P
Total soluble phosphorus	1000 mg/L as P
Soluble ortho phosphorus	790 mg/L as P
Moisture[b]	66.5 g/L
Organic matter[c]	27.5 g/L

a - sampling date August 11, 1980
b - sample dried at 103°C
c - sample ashed at 550°C